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SITE INDEX EQUATIONS FOR BLACK AND WHITE SPRUCE IN NORTHEASTERN B.C. AND YUKON

by

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ABSTRACT

Site index equations are presented for black spruce (Picea mariana (Mill.)B.S.P.) and white spruce (Picea glauca (Moench) Voss.) for the Yukon Territory, Canada. The procedures employed follow the two stage method of developing site index equations and curves from stem analysis data described by Dahms (1975), Monserud (1984), Goudie (1984), Alemdag (1988) and others. Linear regressions between site index and decadal height were used to develop candidate transformations and final variables were selected for the site index equations using stepwise linear regression techniques.

INTRODUCTION

Nawitka Renewable Resource Consultants Ltd., together with Forgis Resource Consultants Ltd. and Forestry Canada, has developed site index equations for black spruce (Picea mariana (Mill.)B.S.P.) and white spruce (Picea glauca (Moench) Voss.) in the Yukon Territory, Canada.

The procedures employed follow the two stage method of developing site index equations and curves from stem analysis data as described by Dahms (1975), Monserud (1984), Goudie (1984), Alemdag (1988) and others. Linear regressions between site index and decadal height were used to develop candidate transformations by relating site index to height. The final variables were selected for the site index equations using stepwise linear regression techniques.

DATA

The stem analysis data used in the analyses were collected by Nawitka Renewable Resource Consultants Ltd., Victoria, B.C., as part of the Canadian Forestry Service Energy from the Forests (ENFOR) program.

The data sets for black and white spruce provided to the Consultants had been preprocessed by Forestry Canada. Intermediate and suppressed sample trees, as well as trees exhibiting significant damage, had been excluded from the data base. Ages at five year intervals, along with their corresponding heights (H) and diameters, as well as sample tree number, plot number and ecoregion were provided.

Sample trees which were less than 50 years of age at breast height were excluded from the data set. The individual sample trees were then examined to identify any trees which had been damaged or which exhibited severe repression and subsequent release. This was accomplished by plotting stem analysis height over age data for individual trees by ecoregion and examining height growth over time. As a result of this examination, two sample trees were discarded from the black spruce data set. In both cases the discarded trees had been suppressed for a considerable period of time and then exhibited release.

METHODS

Following a review of the literature, the methods employed in the course of developing the site index equations for black and white spruce in the Northwest Territories, Canada, followed those reported by Alemdag (1988) and Goudie (1984).

Initially, the procedures of Alemdag were applied. However, evaluation of the equations indicated that site index for the higher sites were consistently overestimated at younger ages.

Consequently the approach taken by Monserud (1984) and modified by Goudie (1984) was tested. These equations overcame the apparent overestimation of site at young ages and provided a better overall fit to the data and are recommended for application.

The site index (S) of each tree was determined by from the estimate of total tree height at breast height age (BHA) of 50 years. Regression equations were fitted for (S-1.3) over (H-1.3) by 10-year age classes using the model:

$$(S-1.3) = a + b\,(H-1.3)$$

The estimated values of a and b, shown below, which have been shown to be age dependent, were then fitted as a function of age. Similar relationships to those of Alemdag were found, namely that the points fell along a parabola of second or higher degree.

AGE	N	a	b	R^2
10	152	1.91087	3.11743	0.5976
20	152	1.40397	1.78743	0.7445
30	152	0.85593	1.33729	0.8972
40	152	0.37303	1.12949	0.9731
50	152	0.00000	1.00000	1.0000
60	148	-0.13898	0.88514	0.9707
70	146	-0.11545	0.78523	0.9317
80	137	-0.10521	0.72282	0.8955
90	128	-0.12182	0.68075	0.8632
100	115	-0.26951	0.65488	0.8425
110	93	-0.34296	0.63640	0.8304
120	66	-0.22860	0.56465	0.7370
130	59	-0.18227	0.52954	0.7119
140	46	-0.13745	0.48208	0.6668
150	34	0.26833	0.41422	0.5860

Table 1. Values of a and b for decadal age classes in the regression (S-1.3)=a +b (H-1.3) for black spruce.

AGE	N	a	b	R^2
10	178	3.34199	3.39625	0.6733
20	178	2.45410	1.92052	0.7771
30	178	1.60998	1.39786	0.8935
40	178	0.72675	1.14545	0.9741
50	178	-0.00000	1.00000	1.0000
60	169	-0.57324	0.90171	0.9763
70	157	-1.01230	0.82667	0.9229
80	145	-1.17074	0.75473	0.8671
90	116	-0.67189	0.64694	0.8010
100	92	-0.39232	0.57388	0.7438
110	79	-0.10546	0.52242	0.6875
120	67	0.45809	0.45160	0.6126
130	57	0.41591	0.43407	0.6157
140	52	0.43843	0.41671	0.6140
150	41	-0.44204	0.46933	0.7346

Table 2. Values of a and b for decadal age classes in the regression (S-1.3)=a +b (H-1.3) for white spruce.

As indicated by Alemdag the above equation can be reformulated as follows:

$$a = b_1 X + b_2 X^2$$

$$b = 1.0 + c_1 Z + c_2 Z^2$$

where: $X = BHA - 50$ or $X = \ln(BHA/50)$

and $Z = BHA - 50$ or $Z = \ln(BHA/50)$

The transformations proposed by Alemdag (1988) above, and those proposed by Goudie (1984) were tested in the derivation of the site index curves.

The results of the regression analyses based on Alemdag's transformations, as reflected by the values of R^2 indicated that the best estimation of site index would be achieved by using the following model:

$$S = 1.3 + (b_1 X + b_2 X^2) + (1.0 + c_1 Z + c_2 Z^2)(H-1.3)$$

The black and white spruce data were fitted to the equation shown below:

$$(S-H) = b_1 X + b_2 X^2 + c_1 (H-1.3)Z + c_2 (h-1.3)Z^2$$

For black and white spruce, the values of b and c were calculated using the SAS/STAT Version 6.3 stepwise linear regression analyses system as follows:

Black Spruce

$$S=1.3+(-.043663X+.000199X^2)+(1.0-.570694Z+.279457Z^2)(H-1.3)$$

$(R^2 = 0.9014 \quad N = 3736)$

where: S = site index
X = BHA-50.
Z = ln(BHA/50.)
H = total height
BHA = age above breast height

White Spruce

$$S=1.3+(-.07747X+.000375X^2)+(1.0-.53488Z+.15296Z^2)(H-1.3)$$

$(R^2 = 0.8899 \quad N = 4483)$

where: S = site index
X = BHA-50.
Z = ln(BHA/50.)
H = total height
BHA = age above breast height

As previously mentioned, the site index equations derived above consistently overestimated the higher sites at young ages.

The approach taken by Goudie was essentially similar to that taken later by Alemdag with the exception of the form of the transformations. The results of the analyses, as reflected by the values of R indicated that the best estimation of site index would be achieved by using the following model:

$$S = H + a*\left(\frac{H}{BHA} - \frac{H}{50}\right) + b*\left(\frac{1}{BHA} - \frac{1}{50}\right) + c*\left(\frac{lnBHA}{BHA} - \frac{ln50}{50}\right)$$

where: S = site index
H = total height
BHA = age above breast height

The black and white spruce data were fitted to the equation shown above and the values of b and c were calculated using stepwise linear regression analyses as follows:

Black Spruce - Recommended Equation

$$S = H + 35.5057*\left(\frac{H}{BHA} - \frac{H}{50}\right) - 52.3049*\left(\frac{1}{BHA} - \frac{1}{50}\right) + 10.026*\left(\frac{lvBHA}{BHA} - \frac{ln50}{50}\right)$$

(R^2 = 0.9251 N = 3703)

where: S = site index
H = total height
BHA = age above breast height

White Spruce - Recommended Equation

$$S = H + 38.037*\left(\frac{H}{BHA} - \frac{H}{50}\right) - 60.5757*\left(\frac{1}{BHA} - \frac{1}{50}\right) + 22.0755*\left(\frac{lvBHA}{BHA} - \frac{ln50}{50}\right)$$

(R^2 = 0.9433 N = 4227)

where: S = site index
H = total height
BHA = age above breast height

The above equations were solved and site index curves and tables were generated as shown in Figures 1 and 2 and Tables 3 and 4 respectively.

The statistics and graphs are presented in Appendices I to VI.

RESULTS AND DISCUSSION

The procedures employed in the derivation of "Site Index Equations for Black and White Spruce in the Northwest Territories, Canada", allowed the relatively easy derivation of site index curves for black and white spruce in the Yukon.

The estimates of site index for white spruce compares favorable with those derived by Alemdag.

In terms of applying the equations, it should be noted that:

- the site index equations derived using the transformations of Goudie give the best overall fit and are the recommended equations,
- the equations for estimating site index for both black and white spruce should not be applied beyond a breast height age of 150 years in order to remain within the data domain, and
- the equations for estimating site index should not be applied below 10 years breast height age in the case of the equations using Alemdag's transformations as ln(BHA/50) approaches minus infinity as BHA approaches zero.

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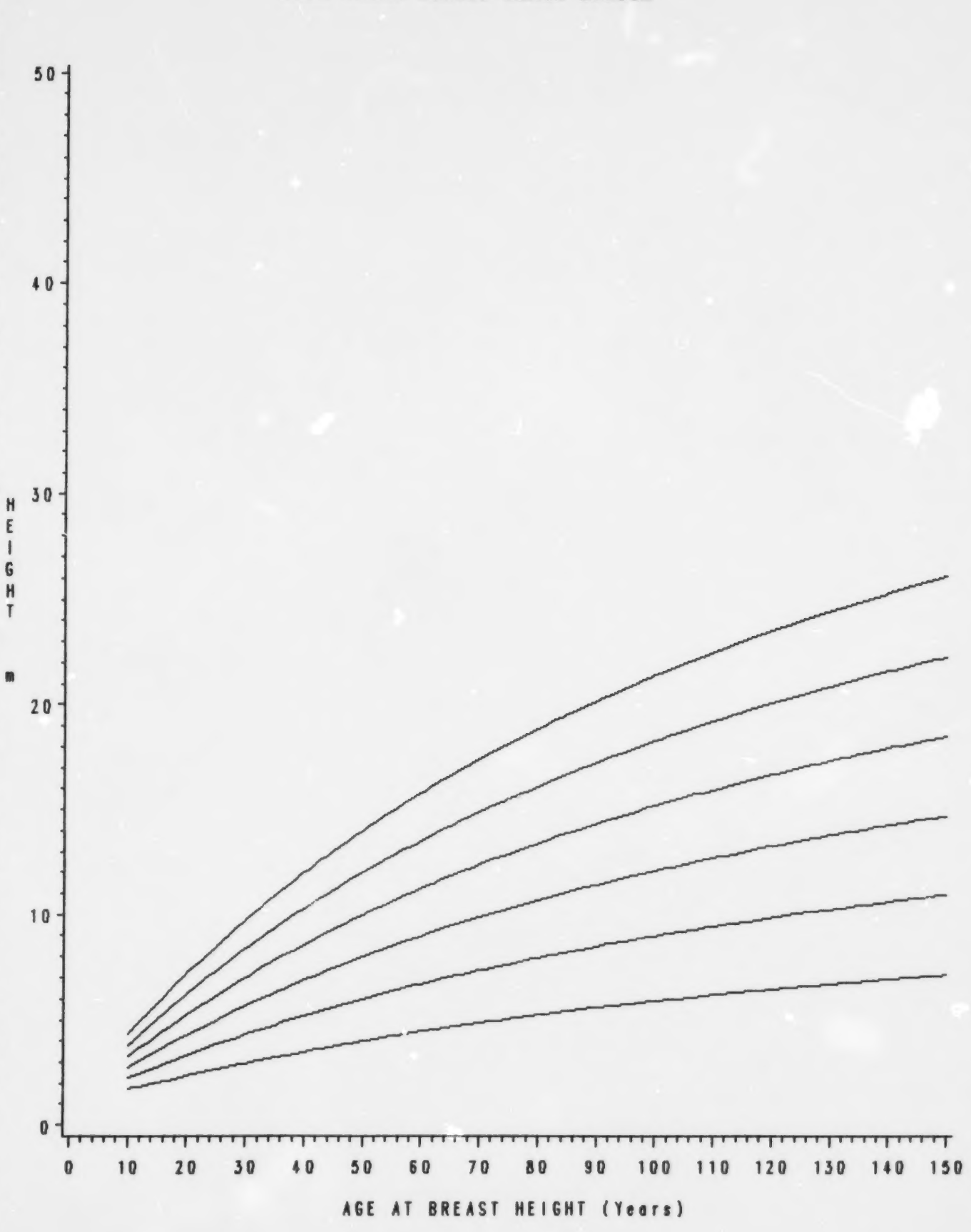

FIGURE 1. Site Index Curves for Black Spruce in the Yukon.

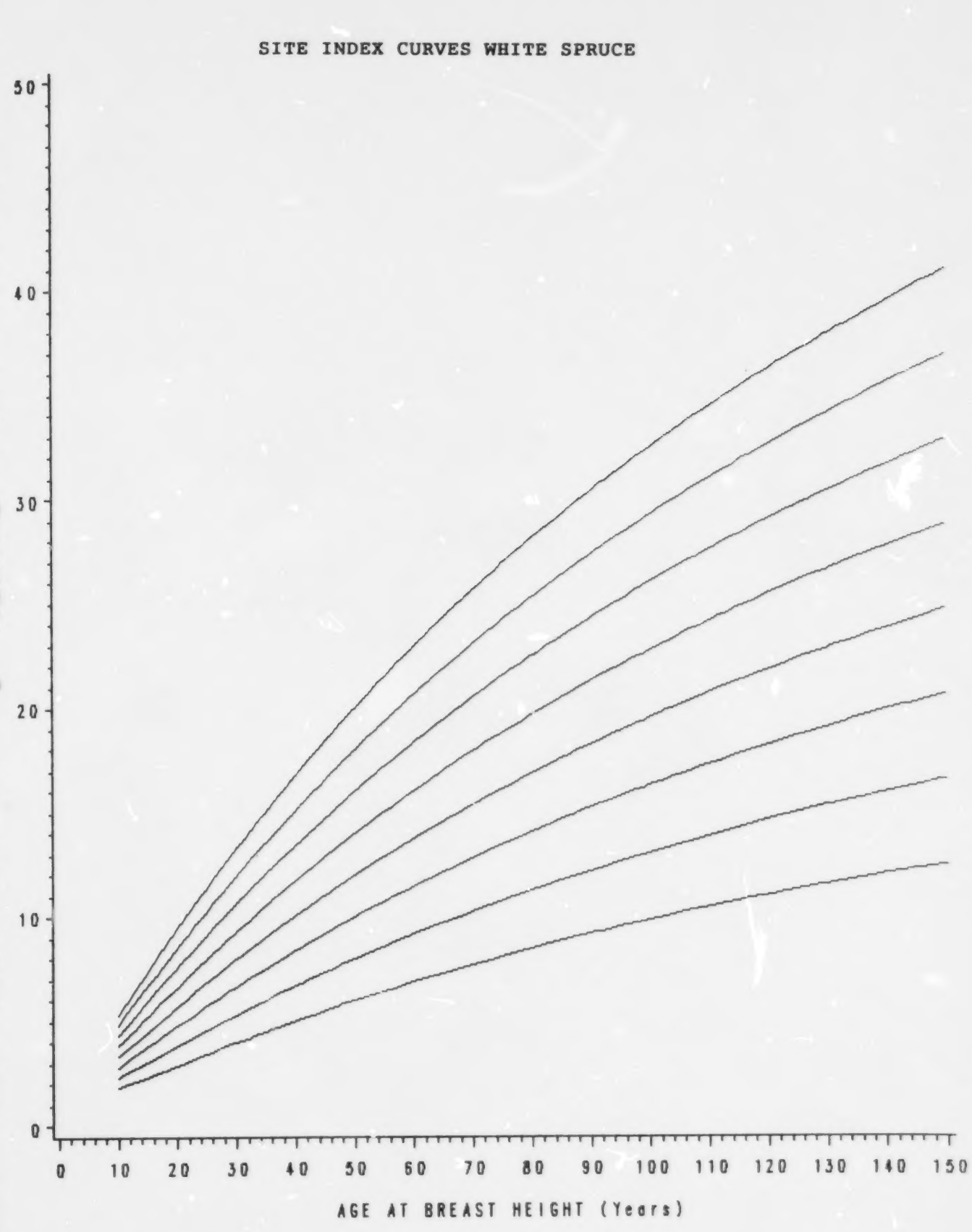

FIGURE 2. Site Index Curves for White Spruce in the Yukon.

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS) :	BREAST HEIGHT SITE INDEX (M.)						
	2	3	4	5	6	7	8
10	1.22	1.48	1.74	2.00	2.26	2.52	2.78
11	1.23	1.51	1.79	2.08	2.37	2.65	2.94
12	1.24	1.55	1.85	2.17	2.47	2.78	3.08
13	1.25	1.58	1.92	2.25	2.58	2.91	3.24
14	1.27	1.63	1.98	2.33	2.69	3.04	3.40
15	1.29	1.67	2.04	2.42	2.79	3.17	3.54
16	1.30	1.71	2.10	2.50	2.90	3.30	3.69
17	1.32	1.75	2.17	2.58	3.00	3.42	3.85
18	1.34	1.78	2.23	2.67	3.11	3.56	4.00
19	1.36	1.82	2.29	2.75	3.21	3.68	4.14
20	1.39	1.87	2.35	2.83	3.32	3.81	4.29
21	1.41	1.91	2.42	2.92	3.42	3.93	4.43
22	1.43	1.95	2.48	3.00	3.52	4.05	4.58
23	1.45	1.99	2.54	3.08	3.63	4.17	4.72
24	1.47	2.03	2.60	3.16	3.73	4.29	4.86
25	1.49	2.07	2.65	3.24	3.83	4.41	5.00
26	1.51	2.12	2.71	3.32	3.92	4.53	5.13
27	1.53	2.15	2.77	3.40	4.02	4.64	5.27
28	1.55	2.19	2.83	3.48	4.12	4.76	5.41
29	1.57	2.23	2.90	3.56	4.21	4.88	5.54
30	1.59	2.27	2.95	3.63	4.31	4.99	5.67
31	1.61	2.31	3.01	3.71	4.40	5.10	5.79
32	1.64	2.35	3.06	3.78	4.50	5.21	5.92
33	1.66	2.39	3.12	3.85	4.58	5.32	6.05
34	1.68	2.43	3.18	3.93	4.67	5.42	6.17
35	1.70	2.46	3.23	4.00	4.76	5.54	6.30
36	1.72	2.50	3.29	4.07	4.86	5.64	6.42
37	1.74	2.54	3.35	4.14	4.95	5.75	6.54
38	1.76	2.58	3.40	4.21	5.03	5.84	6.67
39	1.78	2.62	3.45	4.29	5.12	5.95	6.78
40	1.80	2.65	3.50	4.35	5.20	6.05	6.90
41	1.82	2.69	3.56	4.42	5.29	6.15	7.01
42	1.84	2.73	3.60	4.49	5.37	6.25	7.13
43	1.86	2.76	3.66	4.55	5.45	6.34	7.25
44	1.89	2.79	3.71	4.62	5.53	6.45	7.36
45	1.91	2.83	3.76	4.68	5.61	6.54	7.46
46	1.93	2.87	3.81	4.75	5.69	6.63	7.58
47	1.95	2.90	3.86	4.82	5.77	6.73	7.68
48	1.97	2.94	3.90	4.88	5.85	6.82	7.79
49	1.99	2.97	3.96	4.94	5.92	6.91	7.90

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 9	10	11	12	13	14	15
10	3.04	3.30	3.56	3.82	4.08	4.34	4.60
11	3.21	3.50	3.79	4.07	4.36	4.64	4.92
12	3.40	3.71	4.01	4.32	4.63	4.93	5.24
13	3.57	3.90	4.24	4.57	4.89	5.22	5.56
14	3.75	4.10	4.46	4.81	5.17	5.51	5.87
15	3.92	4.30	4.67	5.05	5.43	5.80	6.18
16	4.09	4.50	4.89	5.29	5.69	6.09	6.49
17	4.27	4.69	5.11	5.53	5.95	6.37	6.79
18	4.44	4.88	5.32	5.76	6.21	6.65	7.09
19	4.61	5.07	5.54	6.00	6.46	6.92	7.38
20	4.78	5.25	5.74	6.22	6.71	7.20	7.68
21	4.94	5.45	5.95	6.46	6.96	7.46	7.96
22	5.10	5.63	6.15	6.67	7.20	7.73	8.26
23	5.26	5.81	6.36	6.90	7.45	7.99	8.54
24	5.42	5.99	6.55	7.12	7.68	8.25	8.81
25	5.58	6.17	6.75	7.33	7.92	8.51	9.09
26	5.74	6.34	6.95	7.55	8.15	8.76	9.36
27	5.89	6.51	7.14	7.76	8.38	9.01	9.63
28	6.04	6.68	7.33	7.97	8.61	9.26	9.89
29	6.20	6.86	7.51	8.18	8.84	9.50	10.16
30	6.34	7.03	7.70	8.38	9.06	9.74	10.41
31	6.50	7.19	7.88	8.59	9.28	9.97	10.68
32	6.64	7.36	8.07	8.78	9.49	10.21	10.93
33	6.79	7.51	8.24	8.98	9.71	10.45	11.18
34	6.92	7.67	8.43	9.18	9.93	10.68	11.43
35	7.07	7.83	8.60	9.37	10.13	10.90	11.66
36	7.21	7.99	8.78	9.55	10.34	11.13	11.91
37	7.34	8.14	8.95	9.74	10.54	11.35	12.14
38	7.48	8.29	9.12	9.93	10.75	11.56	12.38
39	7.62	8.45	9.28	10.12	10.95	11.78	12.62
40	7.75	8.60	9.45	10.29	11.14	11.99	12.85
41	7.88	8.74	9.61	10.47	11.34	12.21	13.07
42	8.01	8.89	9.77	10.65	11.54	12.41	13.29
43	8.14	9.04	9.93	10.83	11.72	12.62	13.52
44	8.27	9.18	10.09	11.00	11.91	12.82	13.73
45	8.39	9.32	10.24	11.18	12.10	13.03	13.96
46	8.52	9.46	10.40	11.35	12.29	13.22	14.17
47	8.64	9.60	10.55	11.51	12.46	13.43	14.38
48	8.77	9.73	10.71	11.68	12.65	13.62	14.59
49	8.88	9.87	10.86	11.84	12.82	13.81	14.80

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 2	3	4	5	6	7	8
50	2.00	3.00	4.00	5.00	6.00	7.00	8.01
51	2.02	3.04	4.05	5.07	6.08	7.09	8.11
52	2.04	3.07	4.09	5.13	6.16	7.18	8.21
53	2.06	3.10	4.14	5.18	6.22	7.27	8.31
54	2.08	3.13	4.19	5.25	6.30	7.36	8.41
55	2.10	3.17	4.24	5.30	6.38	7.44	8.51
56	2.12	3.19	4.28	5.36	6.45	7.53	8.61
57	2.13	3.23	4.33	5.42	6.51	7.61	8.71
58	2.15	3.26	4.37	5.47	6.58	7.70	8.80
59	2.17	3.29	4.41	5.54	6.66	7.78	8.90
60	2.19	3.32	4.46	5.59	6.72	7.86	8.99
61	2.21	3.35	4.50	5.64	6.79	7.94	9.09
62	2.22	3.38	4.54	5.70	6.86	8.02	9.18
63	2.24	3.41	4.58	5.75	6.92	8.10	9.27
64	2.25	3.44	4.63	5.81	6.99	8.18	9.36
65	2.27	3.47	4.67	5.86	7.06	8.26	9.45
66	2.29	3.50	4.71	5.92	7.13	8.33	9.54
67	2.31	3.52	4.75	5.96	7.18	8.40	9.63
68	2.33	3.56	4.79	6.02	7.25	8.48	9.71
69	2.34	3.58	4.83	6.07	7.32	8.55	9.80
70	2.35	3.61	4.87	6.12	7.38	8.63	9.88
71	2.38	3.64	4.91	6.17	7.43	8.71	9.97
72	2.39	3.67	4.95	6.22	7.50	8.78	10.05
73	2.40	3.69	4.98	6.27	7.56	8.85	10.13
74	2.42	3.72	5.02	6.32	7.62	8.92	10.21
75	2.44	3.75	5.06	6.37	7.68	8.99	10.30
76	2.46	3.77	5.09	6.42	7.74	9.06	10.38
77	2.47	3.80	5.13	6.46	7.79	9.13	10.46
78	2.48	3.83	5.17	6.51	7.85	9.20	10.54
79	2.50	3.85	5.21	6.55	7.91	9.26	10.62
80	2.52	3.88	5.24	6.61	7.96	9.33	10.69
81	2.53	3.90	5.28	6.65	8.02	9.39	10.77
82	2.54	3.93	5.31	6.70	8.08	9.46	10.85
83	2.56	3.95	5.34	6.74	8.13	9.53	10.92
84	2.58	3.98	5.38	6.79	8.19	9.59	10.99
85	2.59	4.00	5.42	6.83	8.24	9.65	11.07
86	2.60	4.03	5.45	6.87	8.29	9.72	11.14
87	2.62	4.05	5.48	6.92	8.35	9.78	11.21
88	2.63	4.08	5.51	6.96	8.40	9.84	11.29
89	2.65	4.09	5.55	7.00	8.45	9.90	11.36
90	2.66	4.12	5.58	7.04	8.51	9.96	11.43
91	2.67	4.14	5.62	7.08	8.55	10.03	11.49
92	2.69	4.17	5.64	7.13	8.61	10.09	11.56
93	2.70	4.19	5.68	7.17	8.65	10.14	11.63
94	2.71	4.21	5.71	7.21	8.71	10.21	11.70
95	2.73	4.24	5.74	7.25	8.76	10.26	11.77
96	2.74	4.25	5.77	7.29	8.80	10.32	11.84
97	2.75	4.28	5.80	7.33	8.85	10.38	11.90
98	2.77	4.30	5.83	7.37	8.90	10.44	11.96
99	2.78	4.32	5.87	7.41	8.95	10.49	12.03

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 9	10	11	12	13	14	15
50	9.01	10.01	11.01	12.01	13.01	14.01	15.01
51	9.12	10.13	11.15	12.16	13.18	14.19	15.21
52	9.23	10.27	11.29	12.32	13.35	14.38	15.40
53	9.35	10.39	11.44	12.48	13.52	14.56	15.61
54	9.46	10.52	11.58	12.63	13.69	14.74	15.80
55	9.58	10.65	11.72	12.79	13.86	14.93	15.99
56	9.69	10.78	11.86	12.94	14.02	15.11	16.18
57	9.80	10.89	11.99	13.09	14.19	15.28	16.38
58	9.91	11.02	12.13	13.23	14.35	15.46	16.57
59	10.02	11.14	12.26	13.38	14.51	15.63	16.75
60	10.13	11.26	12.39	13.53	14.66	15.80	16.93
61	10.23	11.38	12.53	13.68	14.82	15.96	17.11
62	10.34	11.49	12.65	13.81	14.97	16.14	17.30
63	10.44	11.62	12.79	13.96	15.13	16.30	17.47
64	10.54	11.73	12.91	14.10	15.28	16.46	17.65
65	10.64	11.84	13.04	14.23	15.43	16.63	17.82
66	10.74	11.96	13.16	14.37	15.58	16.79	18.00
67	10.85	12.06	13.29	14.51	15.72	16.95	18.16
68	10.95	12.18	13.41	14.64	15.87	17.10	18.34
69	11.04	12.29	13.53	14.77	16.02	17.26	18.50
70	11.14	12.39	13.65	14.90	16.16	17.41	18.66
71	11.23	12.50	13.77	15.03	16.30	17.57	18.83
72	11.33	12.61	13.88	15.16	16.44	17.71	18.99
73	11.43	12.71	14.00	15.29	16.57	17.86	19.16
74	11.52	12.81	14.12	15.41	16.71	18.01	19.31
75	11.61	12.92	14.23	15.54	16.85	18.16	19.47
76	11.70	13.02	14.34	15.66	16.98	18.30	19.63
77	11.79	13.12	14.46	15.79	17.11	18.45	19.78
78	11.88	13.22	14.56	15.90	17.25	18.59	19.93
79	11.96	13.32	14.67	16.02	17.38	18.73	20.09
80	12.05	13.42	14.78	16.14	17.50	18.87	20.23
81	12.14	13.52	14.89	16.26	17.64	19.01	20.38
82	12.23	13.61	14.99	16.38	17.76	19.14	20.53
83	12.31	13.71	15.10	16.50	17.89	19.28	20.68
84	12.39	13.80	15.21	16.61	18.01	19.41	20.82
85	12.48	13.89	15.30	16.72	18.14	19.55	20.96
86	12.56	13.98	15.41	16.84	18.25	19.68	21.10
87	12.64	14.08	15.51	16.95	18.38	19.81	21.24
88	12.72	14.17	15.61	17.05	18.50	19.94	21.38
89	12.80	14.26	15.71	17.16	18.61	20.07	21.52
90	12.88	14.35	15.81	17.27	18.73	20.20	21.66
91	12.96	14.44	15.90	17.38	18.85	20.32	21.79
92	13.04	14.53	16.00	17.48	18.96	20.45	21.93
93	13.12	14.61	16.10	17.59	19.08	20.57	22.05
94	13.20	14.70	16.20	17.70	19.19	20.69	22.18
95	13.28	14.78	16.29	17.80	19.30	20.81	22.32
96	13.35	14.87	16.39	17.90	19.41	20.93	22.45
97	13.43	14.95	16.48	18.00	19.52	21.05	22.57
98	13.50	15.04	16.57	18.10	19.64	21.16	22.70
99	13.57	15.12	16.66	18.20	19.74	21.29	22.82

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 2	3	4	5	6	7	8
100	2.79	4.34	5.89	7.45	8.99	10.54	12.10
101	2.81	4.37	5.92	7.49	9.04	10.60	12.16
102	2.82	4.38	5.96	7.52	9.09	10.65	12.22
103	2.83	4.41	5.99	7.56	9.13	10.71	12.29
104	2.85	4.43	6.01	7.59	9.18	10.77	12.35
105	2.85	4.45	6.04	7.63	9.22	10.81	12.41
106	2.87	4.47	6.07	7.67	9.27	10.87	12.47
107	2.88	4.49	6.09	7.71	9.31	10.93	12.53
108	2.90	4.51	6.13	7.74	9.36	10.97	12.59
109	2.90	4.53	6.16	7.78	9.40	11.03	12.65
110	2.92	4.55	6.18	7.82	9.45	11.08	12.71
111	2.93	4.57	6.21	7.85	9.49	11.13	12.77
112	2.94	4.59	6.24	7.88	9.53	11.18	12.82
113	2.95	4.61	6.26	7.92	9.57	11.23	12.88
114	2.96	4.63	6.29	7.95	9.62	11.28	12.94
115	2.98	4.64	6.32	7.99	9.65	11.32	13.00
116	2.98	4.67	6.34	8.02	9.70	11.38	13.05
117	3.00	4.68	6.37	8.05	9.74	11.43	13.11
118	3.01	4.70	6.39	8.09	9.78	11.47	13.16
119	3.02	4.72	6.42	8.12	9.82	11.52	13.22
120	3.03	4.74	6.45	8.15	9.86	11.56	13.28
121	3.04	4.75	6.47	8.19	9.90	11.62	13.33
122	3.06	4.78	6.50	8.22	9.94	11.66	13.38
123	3.06	4.79	6.52	8.25	9.98	11.71	13.44
124	3.08	4.81	6.54	8.28	10.02	11.75	13.49
125	3.08	4.83	6.57	8.31	10.05	11.79	13.54
126	3.10	4.84	6.59	8.35	10.10	11.84	13.59
127	3.10	4.87	6.62	8.38	10.13	11.88	13.64
128	3.12	4.88	6.64	8.40	10.17	11.93	13.70
129	3.13	4.89	6.67	8.44	10.21	11.97	13.74
130	3.14	4.92	6.69	8.46	10.24	12.02	13.79
131	3.15	4.93	6.71	8.49	10.28	12.06	13.85
132	3.16	4.95	6.74	8.53	10.31	12.11	13.89
133	3.17	4.96	6.76	8.55	10.35	12.15	13.95
134	3.18	4.98	6.79	8.59	10.39	12.19	13.99
135	3.19	5.00	6.80	8.62	10.43	12.23	14.04
136	3.20	5.01	6.83	8.64	10.46	12.28	14.09
137	3.21	5.03	6.85	8.67	10.49	12.31	14.13
138	3.22	5.04	6.88	8.70	10.53	12.36	14.19
139	3.23	5.06	6.89	8.73	10.56	12.39	14.23
140	3.23	5.08	6.92	8.76	10.60	12.44	14.28
141	3.25	5.09	6.94	8.79	10.63	12.47	14.32
142	3.25	5.11	6.96	8.81	10.66	12.52	14.37
143	3.27	5.13	6.98	8.84	10.70	12.55	14.41
144	3.27	5.14	7.00	8.87	10.73	12.60	14.46
145	3.29	5.16	7.03	8.89	10.77	12.63	14.51
146	3.29	5.17	7.04	8.92	10.79	12.68	14.55
147	3.31	5.18	7.07	8.95	10.83	12.71	14.60
148	3.31	5.20	7.08	8.97	10.86	12.75	14.63
149	3.32	5.21	7.11	9.00	10.89	12.79	14.68
150	3.33	5.23	7.13	9.03	10.93	12.82	14.72

Table 3. Average Heights of Dominants and Codominants by Breast Height Age and Site for Black Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 9	10	11	12	13	14	15
100	13.64	15.20	16.75	18.30	19.85	21.40	22.95
101	13.72	15.28	16.84	18.39	19.95	21.52	23.07
102	13.79	15.36	16.93	18.50	20.06	21.63	23.20
103	13.86	15.44	17.02	18.59	20.16	21.74	23.32
104	13.93	15.52	17.10	18.68	20.27	21.85	23.43
105	14.00	15.60	17.18	18.78	20.37	21.96	23.55
106	14.07	15.67	17.27	18.87	20.48	22.07	23.68
107	14.14	15.75	17.36	18.96	20.57	22.18	23.79
108	14.21	15.82	17.44	19.05	20.68	22.29	23.91
109	14.28	15.90	17.52	19.15	20.77	22.39	24.02
110	14.34	15.97	17.61	19.24	20.87	22.50	24.14
111	14.41	16.05	17.69	19.33	20.97	22.61	24.25
112	14.47	16.12	17.77	19.41	21.07	22.71	24.36
113	14.54	16.20	17.85	19.50	21.16	22.82	24.47
114	14.61	16.27	17.93	19.59	21.25	22.92	24.58
115	14.67	16.34	18.01	19.68	21.35	23.02	24.69
116	14.73	16.41	18.09	19.77	21.45	23.12	24.80
117	14.79	16.48	18.16	19.85	21.54	23.22	24.91
118	14.86	16.55	18.25	19.93	21.63	23.32	25.02
119	14.92	16.62	18.32	20.02	21.72	23.42	25.12
120	14.98	16.69	18.39	20.11	21.81	23.52	25.23
121	15.04	16.75	18.47	20.18	21.90	23.61	25.33
122	15.11	16.82	18.55	20.27	21.99	23.71	25.43
123	15.16	16.89	18.62	20.35	22.07	23.80	25.54
124	15.22	16.96	18.70	20.43	22.16	23.90	25.64
125	15.28	17.02	18.77	20.51	22.25	24.00	25.73
126	15.34	17.09	18.84	20.59	22.34	24.09	25.84
127	15.40	17.16	18.91	20.66	22.43	24.18	25.93
128	15.46	17.22	18.98	20.75	22.51	24.27	26.04
129	15.52	17.29	19.05	20.82	22.59	24.36	26.13
130	15.57	17.34	19.13	20.90	22.68	24.45	26.23
131	15.63	17.41	19.20	20.98	22.76	24.54	26.32
132	15.69	17.48	19.26	21.05	22.84	24.63	26.42
133	15.74	17.54	19.33	21.13	22.93	24.72	26.52
134	15.79	17.59	19.40	21.20	23.00	24.80	26.61
135	15.85	17.66	19.46	21.27	23.09	24.89	26.70
136	15.90	17.72	19.54	21.35	23.16	24.98	26.80
137	15.96	17.78	19.60	21.42	23.25	25.07	26.89
138	16.01	17.84	19.66	21.50	23.32	25.15	26.98
139	16.07	17.90	19.73	21.57	23.40	25.23	27.07
140	16.11	17.95	19.80	21.64	23.48	25.32	27.16
141	16.17	18.02	19.86	21.70	23.55	25.40	27.25
142	16.22	18.07	19.93	21.77	23.63	25.48	27.34
143	16.27	18.13	19.99	21.84	23.70	25.57	27.42
144	16.32	18.19	20.05	21.91	23.78	25.64	27.51
145	16.38	18.25	20.11	21.98	23.86	25.73	27.59
146	16.43	18.30	20.18	22.05	23.93	25.80	27.68
147	16.48	18.36	20.24	22.12	24.00	25.89	27.77
148	16.52	18.41	20.30	22.18	24.07	25.96	27.85
149	16.57	18.46	20.36	22.25	24.14	26.04	27.93
150	16.63	18.52	20.42	22.32	24.22	26.12	28.02

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 13	14	15	16	17	18	19	20
10	3.58	3.83	4.08	4.33	4.58	4.83	5.07	5.32
11	3.85	4.12	4.38	4.66	4.93	5.20	5.47	5.74
12	4.11	4.40	4.70	4.99	5.28	5.58	5.87	6.16
13	4.37	4.68	5.00	5.32	5.63	5.95	6.26	6.58
14	4.63	4.97	5.30	5.64	5.99	6.32	6.66	7.00
15	4.89	5.25	5.62	5.97	6.33	6.70	7.05	7.42
16	5.16	5.54	5.92	6.30	6.68	7.07	7.45	7.83
17	5.42	5.82	6.22	6.63	7.03	7.43	7.83	8.24
18	5.67	6.09	6.52	6.95	7.37	7.79	8.22	8.64
19	5.93	6.38	6.82	7.27	7.71	8.16	8.61	9.05
20	6.18	6.65	7.12	7.58	8.05	8.52	8.98	9.46
21	6.44	6.92	7.42	7.91	8.39	8.88	9.37	9.86
22	6.70	7.20	7.71	8.21	8.72	9.23	9.74	10.25
23	6.95	7.47	8.00	8.53	9.05	9.59	10.12	10.64
24	7.20	7.74	8.29	8.84	9.38	9.94	10.48	11.03
25	7.44	8.01	8.57	9.14	9.71	10.28	10.85	11.41
26	7.68	8.28	8.86	9.45	10.04	10.63	11.21	11.80
27	7.93	8.54	9.14	9.75	10.36	10.96	11.57	12.18
28	8.17	8.79	9.43	10.05	10.68	11.30	11.93	12.55
29	8.41	9.05	9.70	10.35	10.99	11.63	12.28	12.93
30	8.65	9.31	9.97	10.64	11.30	11.96	12.63	13.29
31	8.88	9.56	10.25	10.93	11.62	12.29	12.97	13.66
32	9.12	9.82	10.52	11.22	11.92	12.62	13.32	14.02
33	9.35	10.07	10.79	11.51	12.22	12.95	13.66	14.38
34	9.58	10.32	11.05	11.79	12.53	13.27	14.00	14.73
35	9.81	10.56	11.31	12.07	12.82	13.58	14.34	15.09
36	10.04	10.80	11.58	12.35	13.12	13.89	14.68	15.44
37	10.26	11.05	11.84	12.63	13.41	14.21	14.99	15.79
38	10.48	11.29	12.10	12.90	13.71	14.52	15.32	16.13
39	10.70	11.53	12.35	13.17	13.99	14.82	15.64	16.46
40	10.92	11.76	12.60	13.44	14.28	15.12	15.96	16.80
41	11.13	11.99	12.85	13.71	14.56	15.42	16.28	17.14
42	11.35	12.22	13.10	13.97	14.85	15.72	16.59	17.46
43	11.56	12.46	13.35	14.23	15.13	16.02	16.91	17.80
44	11.78	12.68	13.59	14.49	15.40	16.30	17.21	18.11
45	11.98	12.90	13.83	14.75	15.67	16.59	17.52	18.44
46	12.19	13.13	14.06	15.01	15.95	16.88	17.82	18.75
47	12.39	13.35	14.30	15.26	16.21	17.16	18.12	19.07
48	12.60	13.57	14.54	15.51	16.48	17.45	18.41	19.39
49	12.80	13.79	14.77	15.76	16.74	17.73	18.71	19.70

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 6	7	8	9	10	11	12
10	1.85	2.10	2.35	2.60	2.85	3.09	3.34
11	1.96	2.23	2.50	2.77	3.04	3.31	3.58
12	2.06	2.35	2.64	2.94	3.23	3.52	3.81
13	2.15	2.48	2.79	3.10	3.42	3.73	4.05
14	2.27	2.60	2.94	3.27	3.62	3.96	4.29
15	2.37	2.73	3.09	3.45	3.81	4.17	4.53
16	2.48	2.86	3.24	3.63	4.00	4.39	4.77
17	2.58	2.99	3.40	3.80	4.20	4.61	5.01
18	2.69	3.12	3.54	3.97	4.39	4.82	5.25
19	2.81	3.25	3.70	4.14	4.59	5.04	5.49
20	2.92	3.38	3.85	4.32	4.79	5.25	5.72
21	3.02	3.52	4.00	4.49	4.97	5.46	5.95
22	3.13	3.65	4.15	4.66	5.17	5.67	6.18
23	3.25	3.77	4.30	4.83	5.36	5.88	6.42
24	3.35	3.90	4.45	5.00	5.55	6.09	6.64
25	3.46	4.04	4.60	5.17	5.74	6.30	6.88
26	3.58	4.16	4.75	5.33	5.92	6.51	7.10
27	3.68	4.29	4.89	5.50	6.11	6.71	7.33
28	3.79	4.42	5.04	5.67	6.29	6.92	7.54
29	3.90	4.54	5.18	5.83	6.47	7.12	7.76
30	4.00	4.67	5.33	6.00	6.66	7.32	7.99
31	4.11	4.79	5.47	6.16	6.84	7.52	8.21
32	4.21	4.92	5.62	6.32	7.02	7.72	8.42
33	4.32	5.04	5.76	6.47	7.20	7.92	8.63
34	4.42	5.17	5.90	6.63	7.37	8.11	8.85
35	4.53	5.29	6.04	6.79	7.54	8.30	9.05
36	4.63	5.41	6.17	6.95	7.72	8.49	9.27
37	4.74	5.53	6.32	7.11	7.89	8.68	9.47
38	4.84	5.64	6.45	7.25	8.06	8.87	9.68
39	4.94	5.76	6.58	7.41	8.23	9.05	9.88
40	5.04	5.88	6.72	7.56	8.40	9.24	10.08
41	5.14	6.00	6.85	7.71	8.56	9.43	10.28
42	5.24	6.11	6.99	7.86	8.73	9.61	10.48
43	5.33	6.22	7.12	8.01	8.89	9.79	10.68
44	5.43	6.34	7.25	8.15	9.05	9.96	10.87
45	5.53	6.45	7.38	8.29	9.22	10.14	11.06
46	5.63	6.57	7.50	8.44	9.38	10.31	11.26
47	5.72	6.67	7.63	8.58	9.54	10.49	11.45
48	5.82	6.79	7.75	8.72	9.70	10.66	11.63
49	5.91	6.89	7.88	8.87	9.85	10.84	11.82

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 6	7	8	9	10	11	12
50	6.00	7.00	8.01	9.01	10.01	11.01	12.01
51	6.09	7.11	8.13	9.14	10.15	11.17	12.19
52	6.18	7.21	8.24	9.28	10.30	11.34	12.37
53	6.28	7.33	8.37	9.41	10.46	11.51	12.55
54	6.37	7.43	8.48	9.54	10.61	11.66	12.72
55	6.46	7.53	8.61	9.68	10.78	11.83	12.90
56	6.54	7.63	8.72	9.81	10.90	11.99	13.08
57	6.63	7.74	8.84	9.95	11.04	12.15	13.26
58	6.72	7.84	8.96	10.07	11.19	12.31	13.43
59	6.81	7.94	9.07	10.21	11.34	12.46	13.60
60	6.89	8.04	9.19	10.33	11.47	12.62	13.77
61	6.98	8.14	9.30	10.46	11.62	12.78	13.94
62	7.07	8.24	9.41	10.59	11.76	12.93	14.10
63	7.15	8.34	9.52	10.71	11.89	13.08	14.27
64	7.24	8.44	9.63	10.83	12.03	13.23	14.43
65	7.32	8.53	9.74	10.96	12.17	13.38	14.60
66	7.40	8.63	9.85	11.07	12.30	13.53	14.76
67	7.48	8.72	9.96	11.20	12.44	13.68	14.91
68	7.56	8.81	10.06	11.32	12.57	13.82	15.07
69	7.64	8.90	10.17	11.44	12.70	13.96	15.23
70	7.72	9.00	10.28	11.55	12.83	14.11	15.39
71	7.80	9.09	10.38	11.67	12.96	14.25	15.54
72	7.88	9.18	10.48	11.79	13.09	14.39	15.70
73	7.96	9.27	10.59	11.90	13.22	14.54	15.85
74	8.04	9.36	10.69	12.02	13.35	14.67	16.00
75	8.11	9.45	10.79	12.13	13.47	14.81	16.15
76	8.19	9.54	10.89	12.24	13.60	14.95	16.30
77	8.27	9.63	10.99	12.36	13.72	15.08	16.45
78	8.34	9.71	11.09	12.46	13.84	15.21	16.59
79	8.41	9.80	11.19	12.57	13.96	15.35	16.73
80	8.48	9.88	11.29	12.69	14.09	15.48	16.88
81	8.56	9.97	11.38	12.79	14.21	15.62	17.02
82	8.63	10.05	11.47	12.90	14.32	15.74	17.16
83	8.71	10.14	11.57	13.01	14.44	15.88	17.30
84	8.78	10.22	11.66	13.11	14.55	16.00	17.45
85	8.85	10.30	11.76	13.21	14.67	16.13	17.59
86	8.92	10.38	11.86	13.32	14.79	16.25	17.72
87	8.99	10.46	11.95	13.43	14.90	16.38	17.86
88	9.06	10.54	12.04	13.53	15.02	16.50	18.00
89	9.13	10.63	12.13	13.63	15.13	16.63	18.13
90	9.20	10.71	12.21	13.73	15.24	16.75	18.26
91	9.27	10.79	12.30	13.83	15.35	16.87	18.39
92	9.33	10.87	12.39	13.93	15.46	16.99	18.52
93	9.40	10.94	12.48	14.03	15.57	17.11	18.66
94	9.46	11.02	12.57	14.13	15.68	17.23	18.79
95	9.53	11.10	12.66	14.22	15.79	17.35	18.91
96	9.60	11.17	12.74	14.32	15.89	17.46	19.04
97	9.66	11.24	12.83	14.41	15.99	17.58	19.16
98	9.72	11.32	12.91	14.51	16.10	17.70	19.29
99	9.79	11.39	13.00	14.61	16.20	17.81	19.41

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 13	14	15	16	17	18	19	20
50	13.01	14.01	15.01	16.00	17.00	18.00	19.00	20.00
51	13.20	14.21	15.23	16.25	17.26	18.27	19.29	20.30
52	13.40	14.43	15.46	16.49	17.52	18.55	19.58	20.61
53	13.60	14.64	15.69	16.73	17.77	18.82	19.86	20.91
54	13.79	14.85	15.90	16.96	18.02	19.09	20.14	21.20
55	13.98	15.05	16.13	17.20	18.27	19.35	20.43	21.50
56	14.17	15.26	16.34	17.43	18.52	19.61	20.70	21.79
57	14.36	15.46	16.56	17.66	18.77	19.87	20.98	22.07
58	14.54	15.66	16.77	17.89	19.01	20.13	21.25	22.36
59	14.73	15.86	16.99	18.12	19.25	20.39	21.52	22.64
60	14.91	16.05	17.20	18.[illegible]	19.50	20.64	21.79	22.93
61	15.10	16.25	17.41	18.57	19.73	20.89	22.05	23.20
62	15.28	16.45	17.62	18.79	19.96	21.14	22.31	23.48
63	15.46	16.64	17.82	19.01	20.20	21.39	22.57	23.75
64	15.63	16.83	18.03	19.23	20.43	21.63	22.83	24.03
65	15.80	17.02	18.23	19.45	20.66	21.87	23.09	24.30
66	15.98	17.21	18.43	19.66	20.89	22.11	23.34	24.57
67	16.16	17.39	18.64	19.87	21.11	22.35	23.59	24.83
68	16.32	17.58	18.83	20.09	21.34	22.59	23.84	25.09
69	16.50	17.76	19.02	20.29	21.55	22.82	24.09	25.35
70	16.66	17.95	19.22	20.50	21.77	23.05	24.33	25.61
71	16.84	18.13	19.41	20.70	22.00	23.29	24.57	25.86
72	17.00	18.30	19.61	20.91	22.21	23.52	24.82	26.12
73	17.16	18.48	19.80	21.11	22.43	23.74	25.05	26.37
74	17.32	18.66	19.98	21.31	22.64	23.96	25.30	26.62
75	17.49	18.83	20.17	21.51	22.85	24.19	25.53	26.86
76	17.65	19.00	20.36	21.70	23.05	24.41	25.76	27.11
77	17.81	19.18	20.54	21.90	23.27	24.63	25.99	27.36
78	17.97	19.34	20.72	22.09	23.47	24.84	26.22	27.60
79	18.13	19.51	20.90	22.29	23.68	25.06	26.45	27.84
80	18.28	19.68	21.08	22.48	23.88	25.27	26.68	28.07
81	18.43	19.84	21.25	22.66	24.08	25.49	26.90	28.31
82	18.59	20.01	21.43	22.86	24.27	25.70	27.12	28.55
83	18.74	20.18	21.61	23.04	24.48	25.91	27.34	28.77
84	18.89	20.34	21.78	23.23	24.67	26.11	27.56	29.00
85	19.04	20.50	21.95	23.41	24.86	26.32	27.77	29.23
86	19.19	20.66	22.13	23.59	25.06	26.52	28.00	29.46
87	19.34	20.82	22.30	23.77	25.25	26.73	28.20	29.68
88	19.48	20.97	22.46	23.95	25.44	26.93	28.42	29.91
89	19.63	21.13	22.63	24.13	25.63	27.13	28.63	30.13
90	19.77	21.28	22.80	24.30	25.82	27.32	28.84	30.34
91	19.91	21.43	22.95	24.48	26.00	27.52	29.05	30.57
92	20.05	21.59	23.12	24.65	26.18	27.71	29.25	30.78
93	20.20	21.74	23.28	24.82	26.36	27.91	29.45	31.00
94	20.34	21.89	23.44	25.00	26.55	28.10	29.66	31.20
95	20.48	22.04	23.60	25.16	26.73	28.29	29.86	31.42
96	20.61	22.18	23.76	25.34	26.91	28.48	30.05	31.63
97	20.75	22.34	23.91	25.50	27.09	28.67	30.25	31.84
98	20.89	22.48	24.07	25.66	27.26	28.86	30.45	32.04
99	21.02	22.62	24.23	25.83	27.43	29.04	30.64	32.24

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS)	BREAST HEIGHT SITE INDEX (M.) 6	7	8	9	10	11	12
100	9.86	11.47	13.09	14.70	16.31	17.93	19.54
101	9.92	11.54	13.16	14.79	16.41	18.04	19.66
102	9.98	11.62	13.25	14.88	16.52	18.15	19.78
103	10.04	11.69	13.33	14.97	16.61	18.26	19.91
104	10.11	11.76	13.41	15.06	16.71	18.37	20.02
105	10.16	11.83	13.49	15.15	16.82	18.48	20.14
106	10.23	11.90	13.57	15.24	16.91	18.59	20.26
107	10.29	11.97	13.65	15.34	17.02	18.70	20.38
108	10.35	12.04	13.73	15.42	17.11	18.80	20.50
109	10.41	12.11	13.81	15.51	17.21	18.91	20.61
110	10.47	12.18	13.88	15.60	17.30	19.02	20.73
111	10.53	12.24	13.96	15.69	17.40	19.12	20.84
112	10.59	12.31	14.04	15.77	17.50	19.23	20.95
113	10.64	12.38	14.12	15.86	17.59	19.32	21.07
114	10.70	12.45	14.20	15.94	17.68	19.43	21.18
115	10.76	12.52	14.27	16.02	17.77	19.53	21.29
116	10.81	12.58	14.35	16.11	17.87	19.63	21.39
117	10.88	12.64	14.41	16.19	17.96	19.73	21.50
118	10.93	12.71	14.49	16.27	18.05	19.83	21.61
119	10.98	12.78	14.56	16.36	18.14	19.93	21.72
120	11.04	12.84	14.63	16.43	18.23	20.03	21.82
121	11.10	12.90	14.71	16.52	18.32	20.13	21.93
122	11.15	12.96	14.78	16.59	18.41	20.23	22.04
123	11.21	13.03	14.85	16.68	18.50	20.32	22.14
124	11.26	13.09	14.92	16.75	18.59	20.41	22.25
125	11.31	13.15	14.99	16.83	18.67	20.51	22.35
126	11.37	13.21	15.06	16.91	18.76	20.61	22.45
127	11.42	13.28	15.13	16.98	18.84	20.70	22.55
128	11.47	13.34	15.20	17.07	18.93	20.79	22.66
129	11.53	13.39	15.27	17.14	19.01	20.89	22.75
130	11.57	13.46	15.34	17.21	19.09	20.98	22.86
131	11.63	13.52	15.40	17.29	19.18	21.07	22.95
132	11.68	13.57	15.47	17.36	19.26	21.16	23.05
133	11.73	13.63	15.54	17.44	19.34	21.25	23.15
134	11.78	13.69	15.61	17.52	19.43	21.34	23.25
135	11.83	13.75	15.67	17.59	19.50	21.43	23.34
136	11.88	13.80	15.73	17.66	19.59	21.52	23.44
137	11.93	13.87	15.80	17.73	19.67	21.60	23.54
138	11.98	13.92	15.87	17.80	19.75	21.69	23.63
139	12.03	13.97	15.93	17.88	19.82	21.77	23.73
140	12.07	14.04	15.99	17.95	19.91	21.86	23.82
141	12.13	14.09	16.05	18.02	19.98	21.95	23.91
142	12.18	14.14	16.11	18.09	20.06	22.03	24.00
143	12.22	14.20	16.18	18.16	20.14	22.11	24.09
144	12.27	14.26	16.24	18.23	20.21	22.20	24.18
145	12.31	14.31	16.30	18.30	20.29	22.29	24.27
146	12.36	14.37	16.36	18.36	20.36	22.36	24.36
147	12.41	14.41	16.43	18.43	20.44	22.45	24.45
148	12.46	14.47	16.48	18.50	20.52	22.53	24.55
149	12.50	14.53	16.55	18.57	20.59	22.61	24.64
150	12.54	14.57	16.61	18.64	20.66	22.69	24.72

Table 4. Average Heights of Dominants and Codominants by Breast Height Age and Site for White Spruce

AGE (YEARS) :	BREAST HEIGHT SITE INDEX (M.) 13	14	15	16	17	18	19	20
100	21.15	22.77	24.38	26.00	27.61	29.22	30.84	32.45
101	21.29	22.91	24.53	26.16	27.78	29.41	31.02	32.65
102	21.41	23.05	24.68	26.32	27.95	29.59	31.21	32.85
103	21.55	23.19	24.84	26.48	28.12	29.76	31.41	33.05
104	21.68	23.33	24.98	26.64	28.29	29.94	31.59	33.24
105	21.80	23.46	25.13	26.79	28.45	30.11	31.78	33.44
106	21.93	23.61	25.27	26.95	28.62	30.29	31.96	33.63
107	22.06	23.74	25.42	27.11	28.79	30.46	32.15	33.83
108	22.18	23.88	25.57	27.25	28.95	30.64	32.33	34.02
109	22.31	24.01	25.71	27.41	29.11	30.81	32.51	34.21
110	22.43	24.14	25.85	27.56	29.27	30.98	32.69	34.40
111	22.55	24.27	26.00	27.71	29.43	31.15	32.87	34.59
112	22.68	24.41	26.14	27.86	29.59	31.32	33.05	34.77
113	22.80	24.54	26.27	28.01	29.75	31.48	33.22	34.95
114	22.92	24.66	26.41	28.16	29.90	31.64	33.40	35.14
115	23.04	24.80	26.55	28.30	30.05	31.81	33.56	35.32
116	23.16	24.92	26.68	28.45	30.21	31.98	33.73	35.50
117	23.27	25.05	26.82	28.59	30.36	32.13	33.91	35.68
118	23.39	25.18	26.95	28.73	30.52	32.30	34.08	35.86
119	23.51	25.30	27.09	28.88	30.66	32.45	34.24	36.03
120	23.63	25.43	27.22	29.02	30.82	32.62	34.41	36.21
121	23.74	25.55	27.35	29.16	30.96	32.77	34.58	36.38
122	23.86	25.67	27.48	29.30	31.11	32.92	34.74	36.55
123	23.96	25.79	27.61	29.43	31.26	33.08	34.91	36.73
124	24.08	25.91	27.74	29.57	31.41	33.23	35.07	36.90
125	24.19	26.03	27.87	29.71	31.55	33.39	35.23	37.07
126	24.30	26.15	28.00	29.84	31.70	33.54	35.39	37.23
127	24.41	26.27	28.13	29.98	31.84	33.69	35.55	37.41
128	24.52	26.39	28.25	30.11	31.98	33.84	35.70	37.57
129	24.63	26.50	28.38	30.25	32.12	33.99	35.87	37.73
130	24.73	26.61	28.50	30.38	32.26	34.14	36.02	37.90
131	24.84	26.73	28.62	30.51	32.40	34.28	36.17	38.06
132	24.95	26.84	28.74	30.64	32.53	34.43	36.33	38.23
133	25.05	26.96	28.86	30.77	32.67	34.58	36.48	38.38
134	25.16	27.07	28.98	30.89	32.80	34.72	36.63	38.54
135	25.27	27.18	29.11	31.02	32.95	34.86	36.78	38.70
136	25.37	27.30	29.23	31.15	33.08	35.01	36.93	38.86
137	25.47	27.41	29.34	31.27	33.21	35.15	37.08	39.02
138	25.57	27.52	29.46	31.40	33.34	35.28	37.23	39.17
139	25.68	27.63	29.57	31.52	33.48	35.42	37.38	39.33
140	25.77	27.73	29.69	31.65	33.60	35.56	37.52	39.48
141	25.88	27.84	29.80	31.77	33.73	35.70	37.66	39.63
142	25.98	27.95	29.92	31.89	33.87	35.84	37.80	39.78
143	26.07	28.05	30.04	32.02	33.99	35.97	37.95	39.93
144	26.18	28.16	30.14	32.13	34.12	36.10	38.09	40.08
145	26.27	28.27	30.26	32.25	34.24	36.24	38.23	40.23
146	26.37	28.37	30.37	32.37	34.37	36.37	38.38	40.38
147	26.46	28.47	30.48	32.49	34.49	36.51	38.51	40.52
148	26.56	28.57	30.59	32.60	34.62	36.63	38.65	40.66
149	26.66	28.68	30.70	32.72	34.74	36.77	38.79	40.81
150	26.75	28.78	30.81	32.84	34.87	36.90	38.92	40.95

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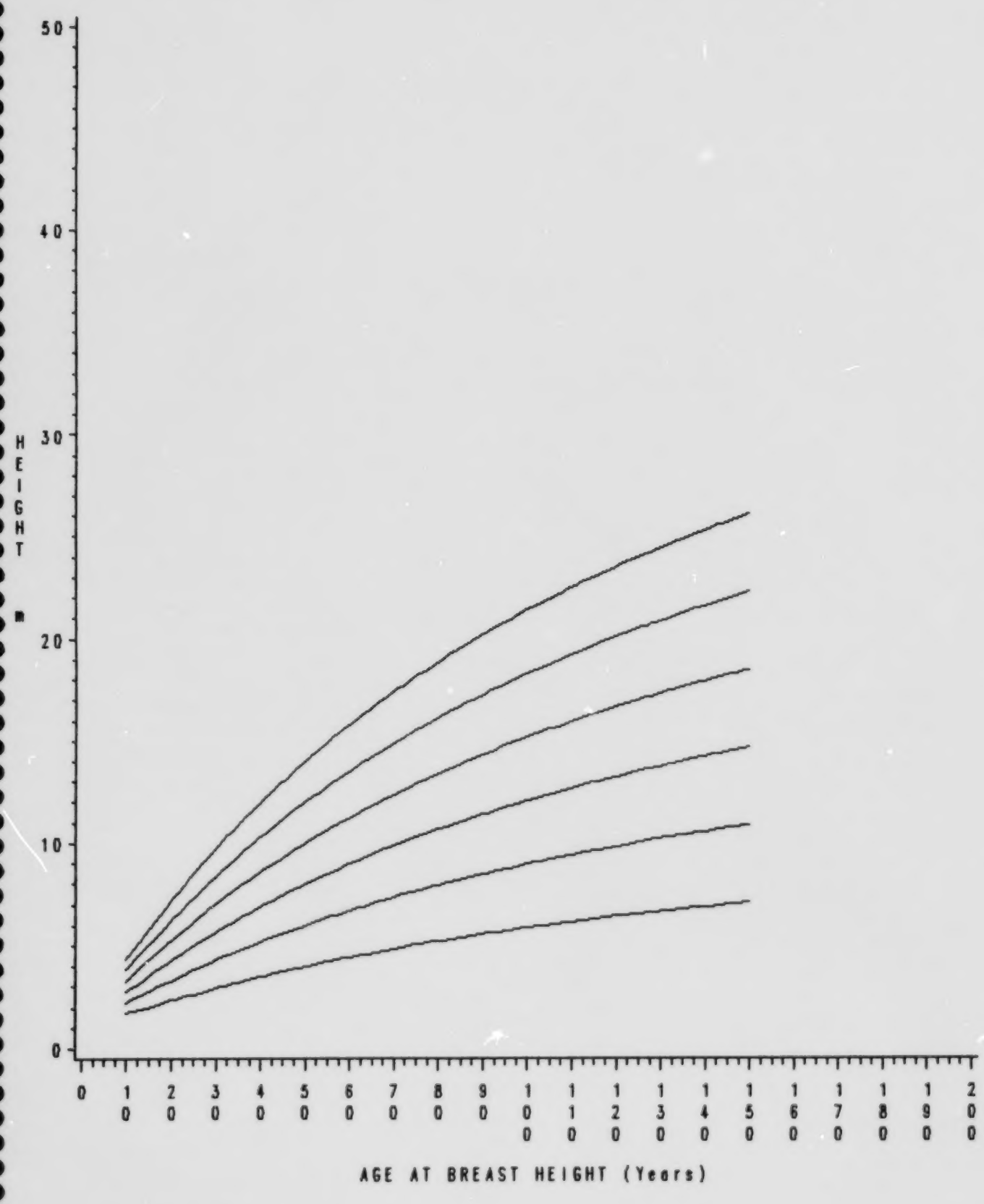
APPENDIX I

Site Index Curves and Statistics for Black Spruce Using Goudie Transformations

SITE INDEX CURVES BLACK SPRUCE



SAS

Model: MODEL1 - BLACK SPRUCE
NOTE: No intercept in model. R-square is redefined.
Dependent Variable: A

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	44774.62673	14924.87558	15229.359	0.0000
Error	3700	3626.02511	0.98001		
U Total	3703	48400.65184			

Root MSE	0.98995	R-square	0.9251
Dep Mean	-0.69418	Adj R-sq	0.9250
C.V.	-142.60689		

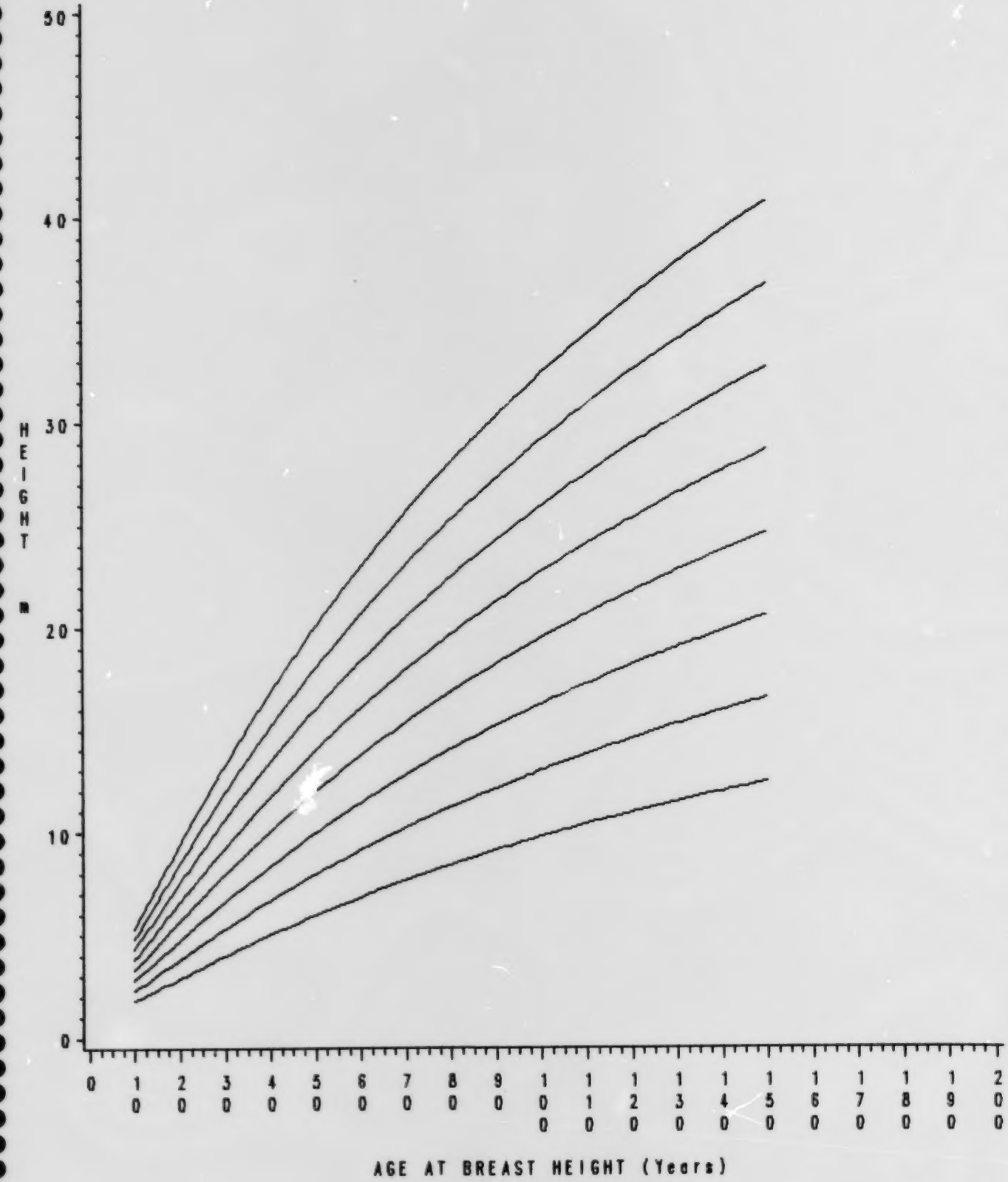
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
B	1	35.505692	0.29251227	121.382	0.0000
C	1	-52.304917	0.53610594	-97.565	0.0000
D	1	10.026011	0.64061218	15.651	0.0001

APPENDIX II

Site Index Curves and Statistics for White Spruce Using Goudie Transformations

SITE INDEX CURVES WHITE SPRUCE



SAS

Model: MODEL1 - WHITE SPRUCE
NOTE: No intercept in model. R-square is redefined.
Dependent Variable: A

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	180438.84305	60146.28102	23441.212	0.0000
Error	4224	10838.08660	2.56583		
U Total	4227	191276.92965			

Root MSE	1.60182	R-square	0.9433
Dep Mean	-1.58594	Adj R-sq	0.9433
C.V.	-101.00127		

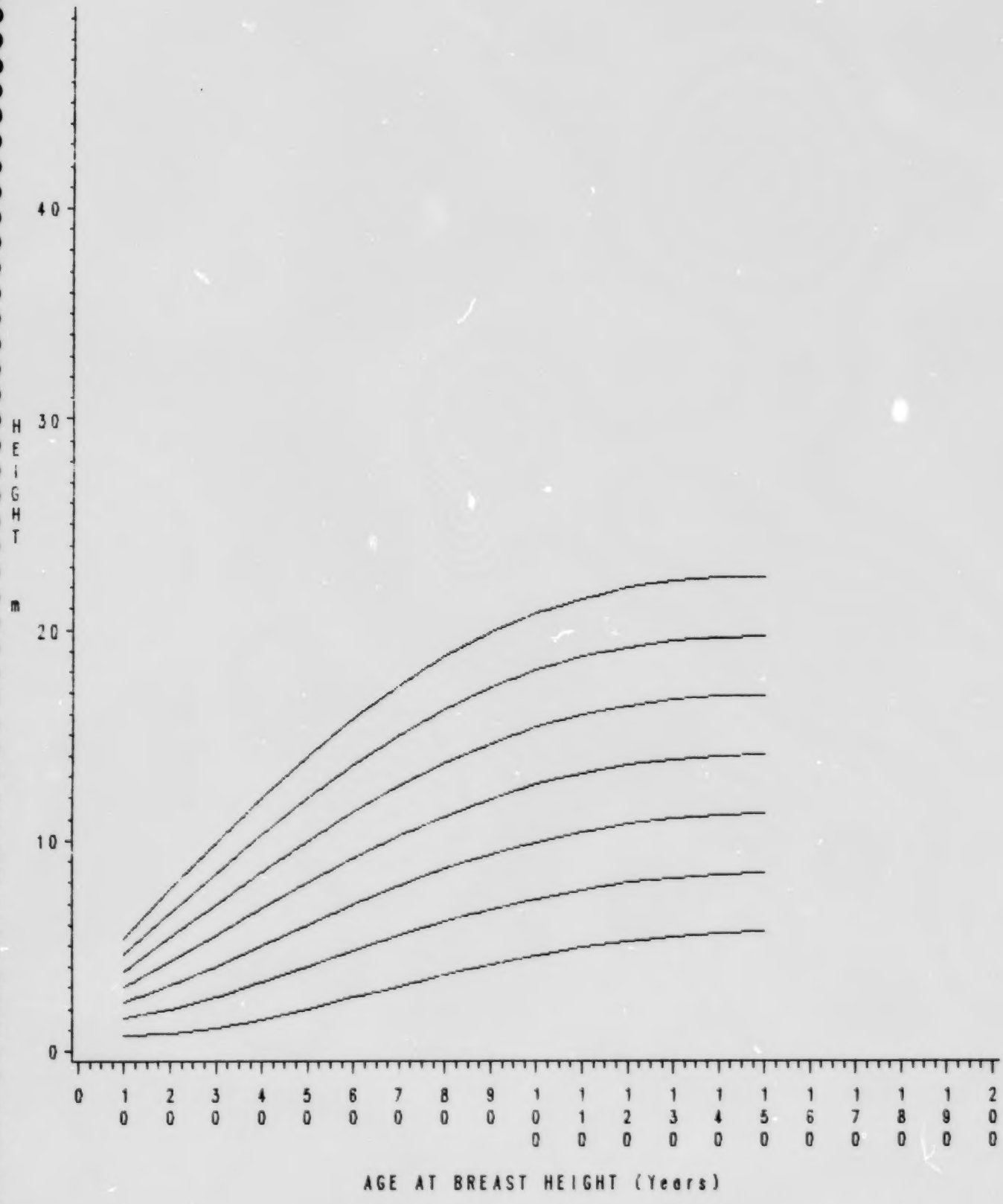
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
B	1	38.037034	0.22520742	168.898	0.0000
C	1	-60.575711	0.69867880	-86.700	0.0000
D	1	22.075477	0.83066512	26.576	0.0001

APPENDIX III

Site Index Curves and Statistics for Black Spruce Using Alemdag Transformations

SITE INDEX CURVES BLACK SPRUCE



BLACK SPRUCE SITE INDEX REGRESSION ANALYSIS

SAS 13:59 Wednesday, February 22, 1989

Model: MODEL2
NOTE: No intercept in model. R-square is redefined.
Dependent Variable: A

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	4	44806.08805	11201.52201	8531.377	0.0000
Error	3732	4900.03895	1.31298		
U Total	3736	49706.12700			

Root MSE	1.14585	R-square	0.9014
Dep Mean	-0.63534	Adj R-sq	0.9013
C.V.	-180.35352		

SAS 13:59 Wednesday, February 22, 1989

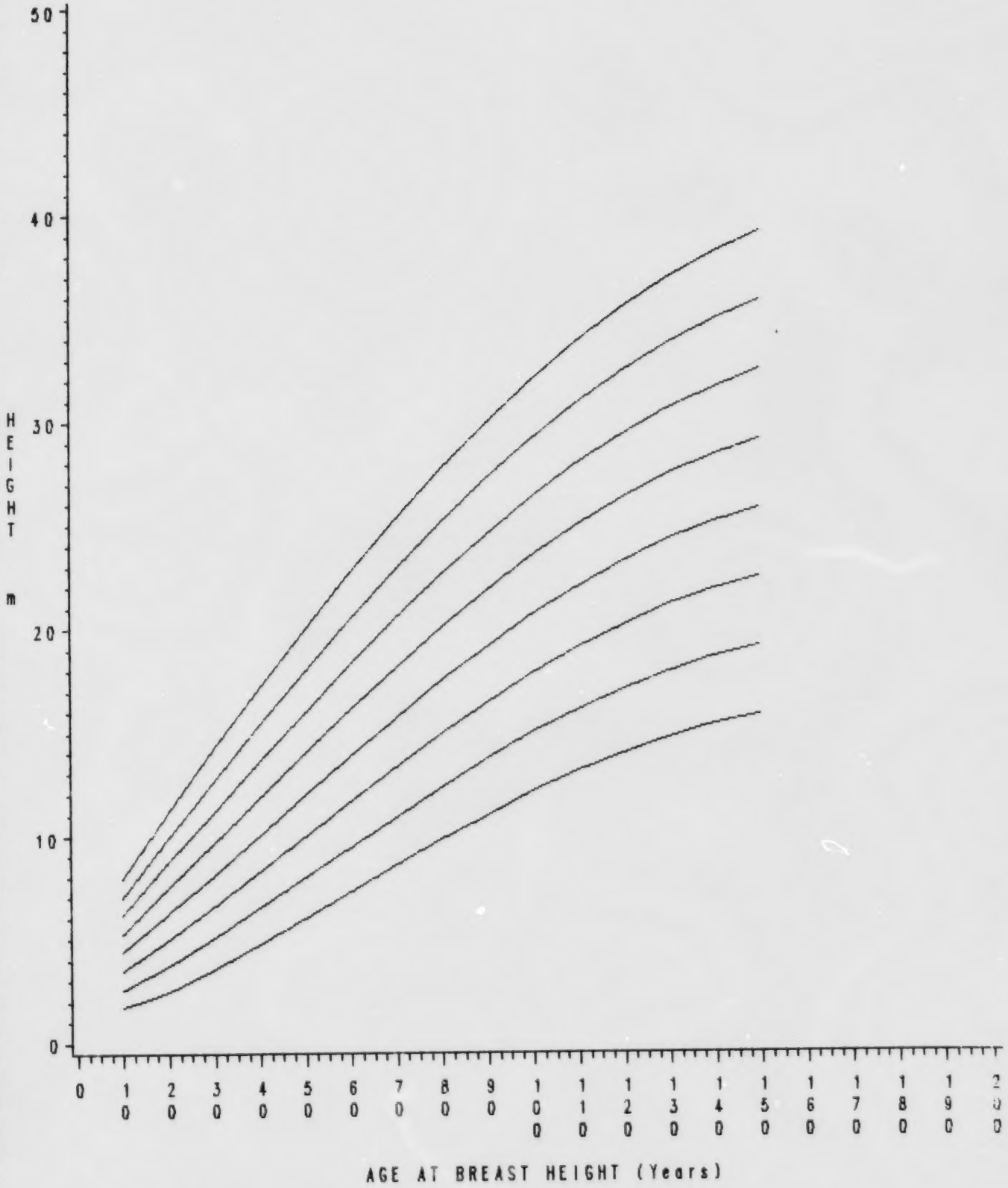
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
C1	1	-0.043663	0.00147752	-29.551	0.0001
C2	1	0.000199	0.00001765	11.294	0.0001
E1	1	-0.570694	0.01495595	-38.158	0.0001
E2	1	0.279457	0.01520902	18.374	0.0001

APPENDIX IV

Site Index Curves and Statistics for White Spruce Using Alemdag Transformations

SITE INDEX CURVES WHITE SPRUCE



WHITE SPRUCE REGRESSION ANALYSIS

Model: MODEL1
NOTE: No intercept in model. R-square is redefined.
Dependent Variable: A

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	4	179131.38404	44782.84601	9048.142	0.0000
Error	4479	22168.34826	4.94940		
U Total	4483	201299.73230			

Root MSE	2.22472	R-square	0.8899
Dep Mean	-1.31017	Adj R-sq	0.8898
C.V.	-169.80371		

Parameter Estimates

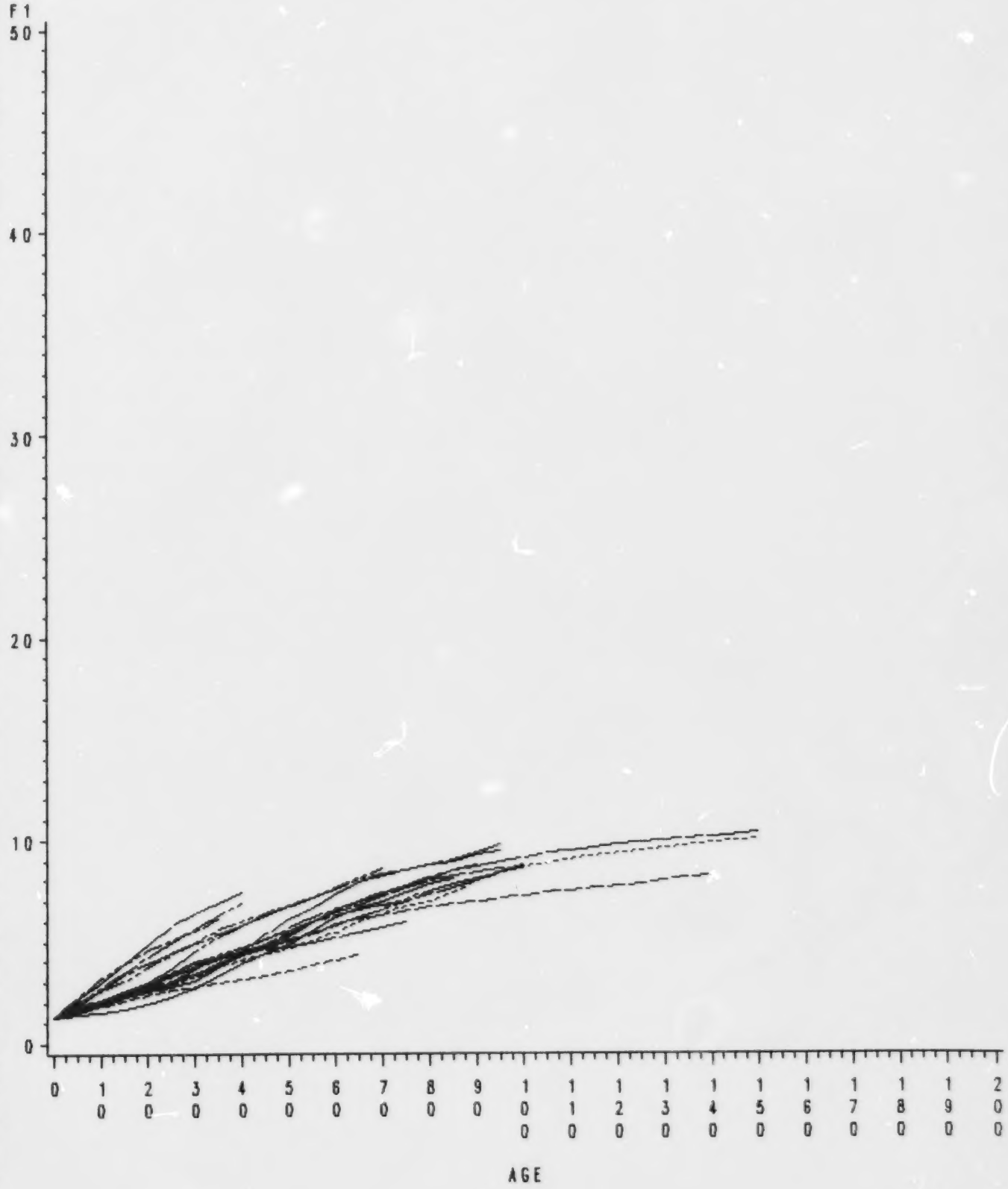
Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
C1	1	-0.077465	0.00230775	-33.567	0.0001
C2	1	0.000375	0.00001998	18.768	0.0001
E1	1	-0.534884	0.01659776	-32.226	0.0001
E2	1	0.152962	0.01400438	10.922	0.0001

APPENDIX V

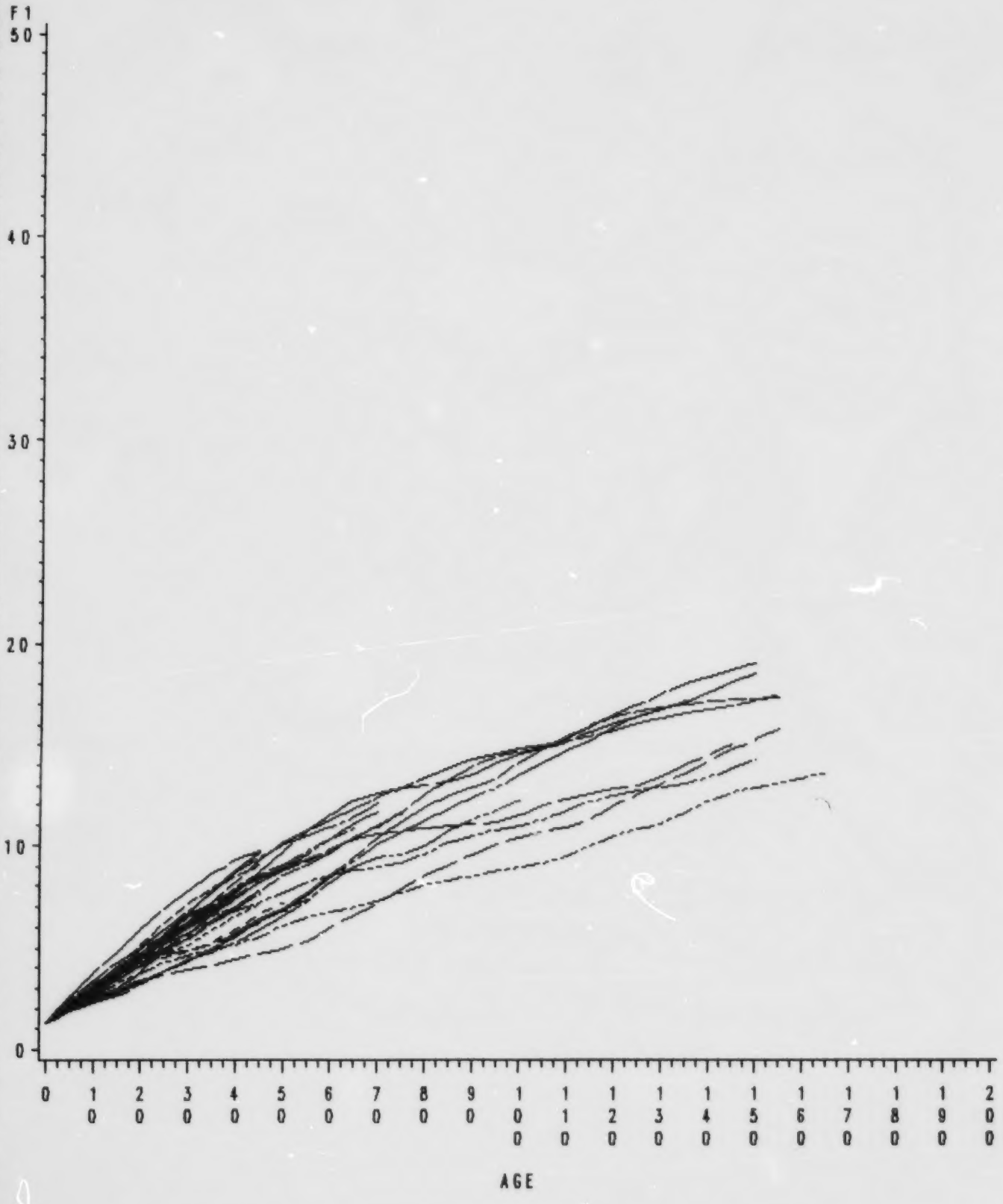
Black Spruce Data Plots and Statistics

HEIGHT OVER AGE – DATA SET BS2

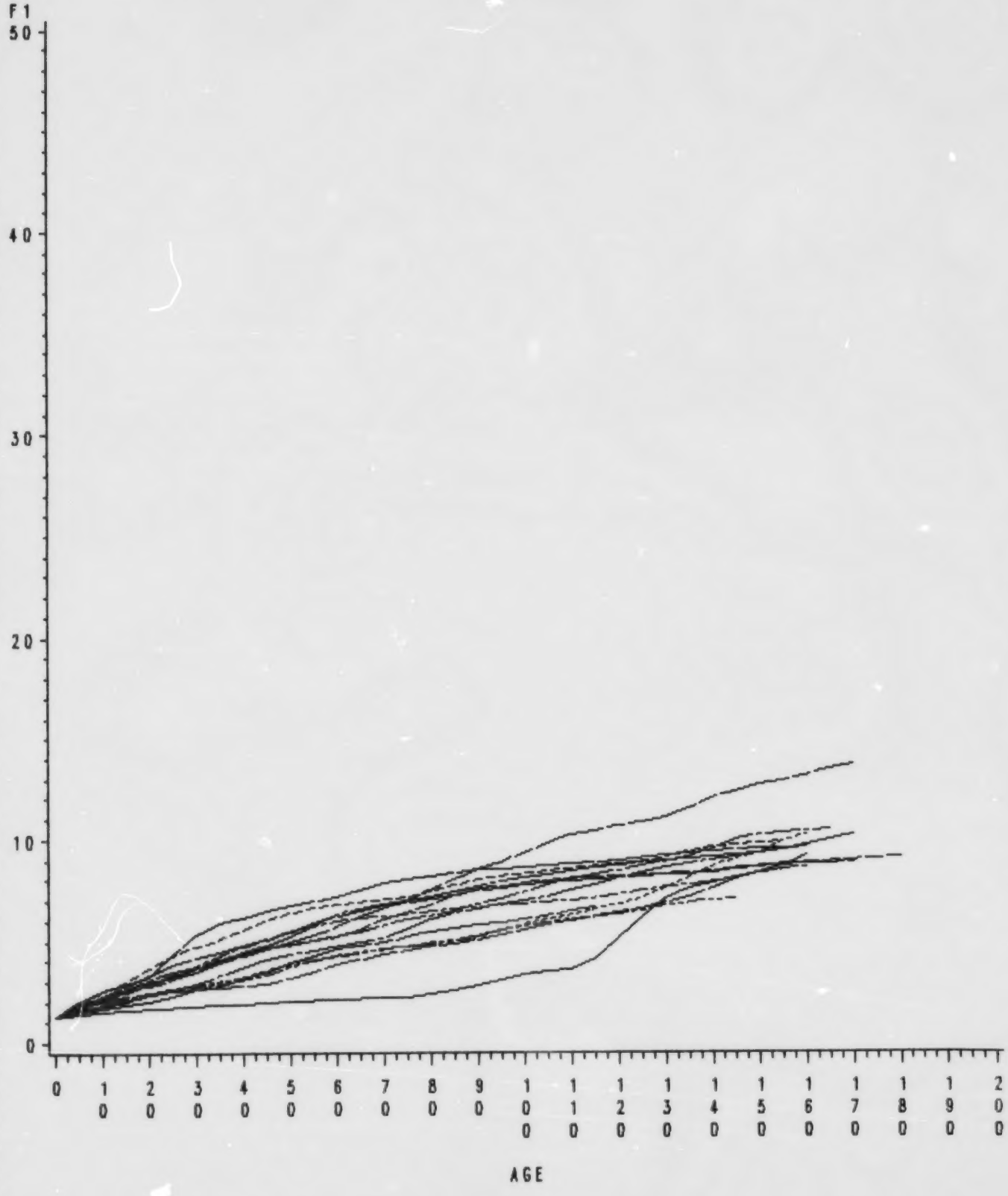
HEIGHT OVER AGE – DATA SET BS4



HEIGHT OVER AGE – DATA SET BS5



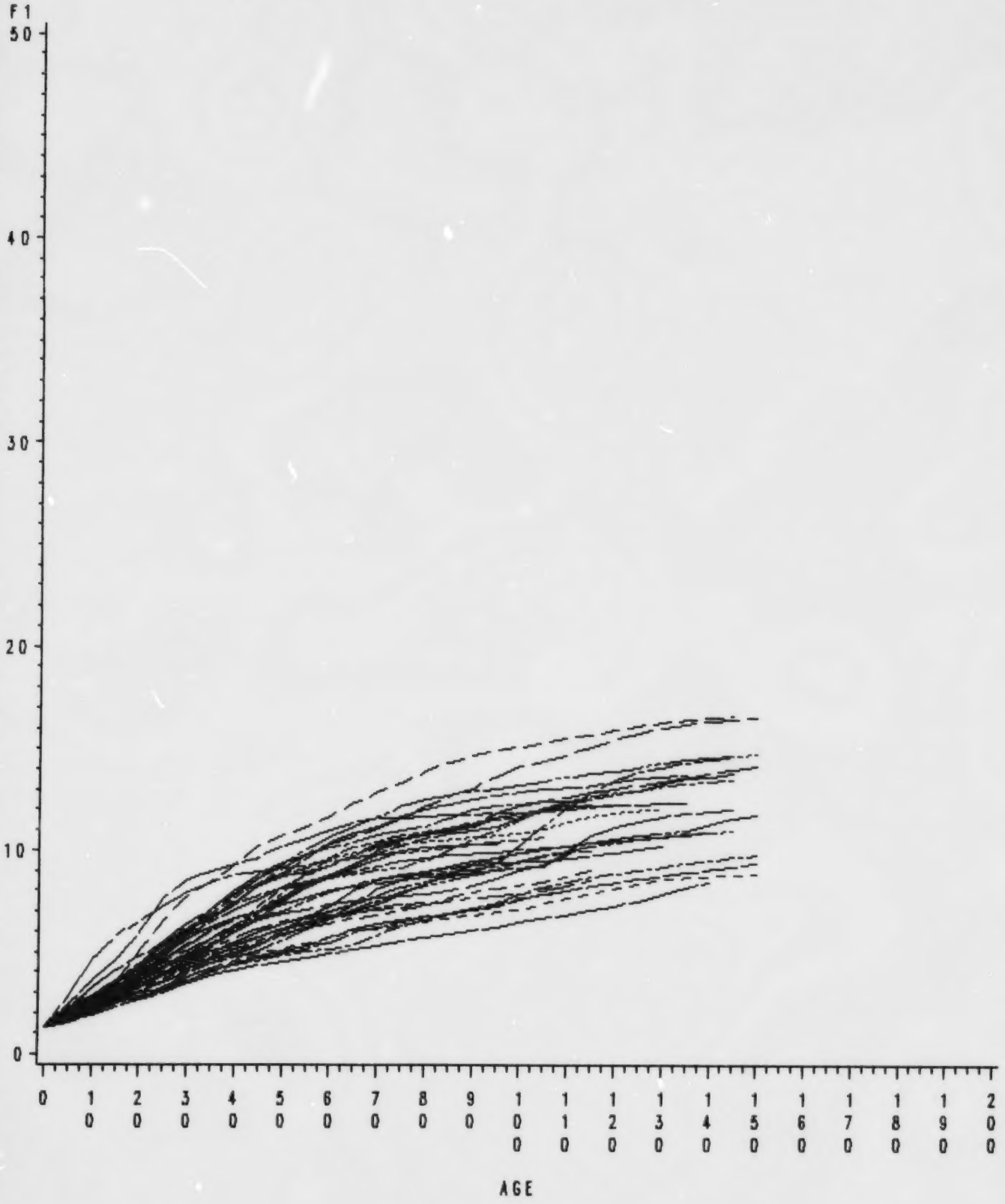
HEIGHT OVER AGE – DATA SET BS8



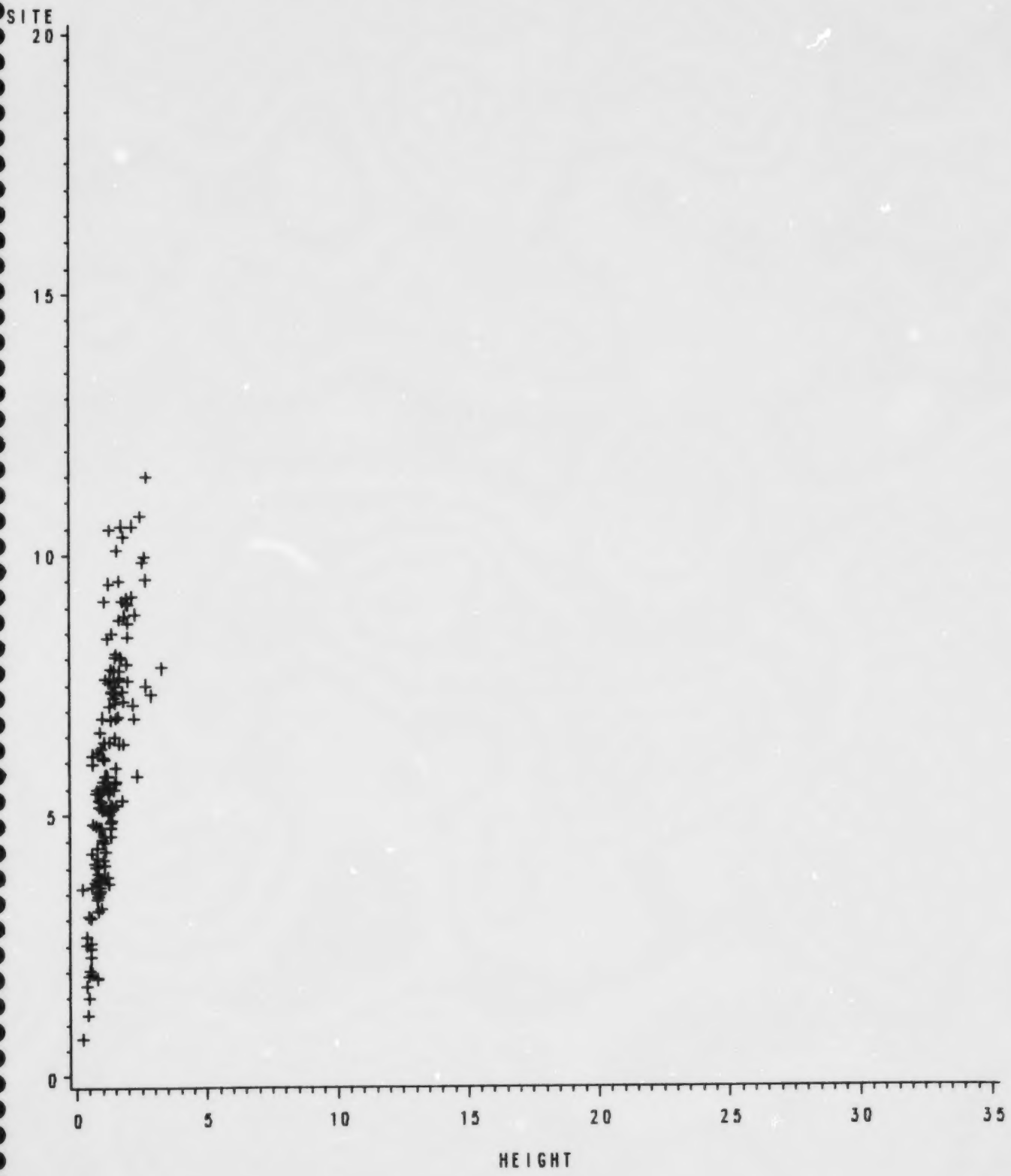
HEIGHT OVER AGE – DATA SET BS9

HEIGHT OVER AGE – DATA SET BS11

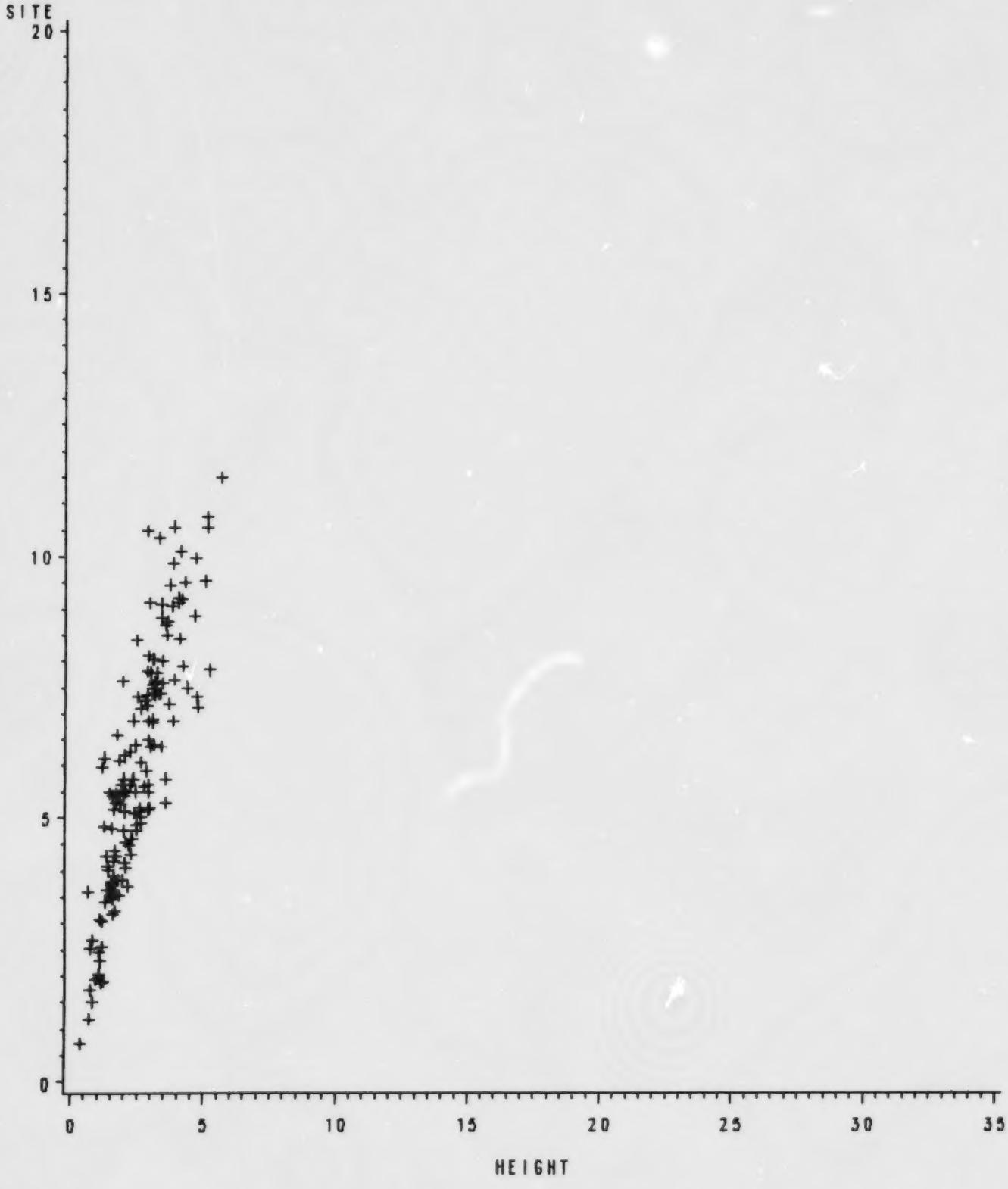
HEIGHT OVER AGE – DATA SET BS12



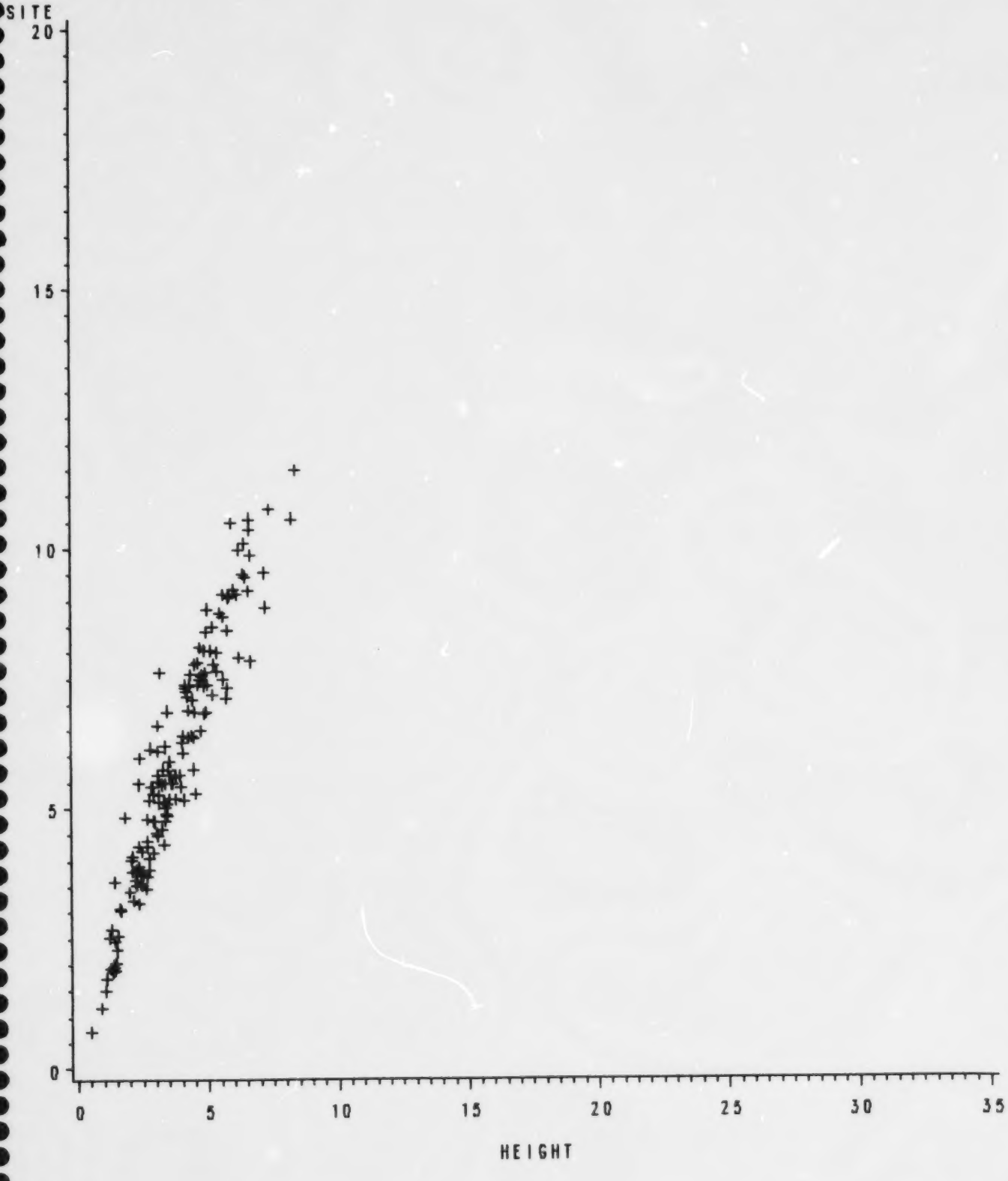
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 10 YRS



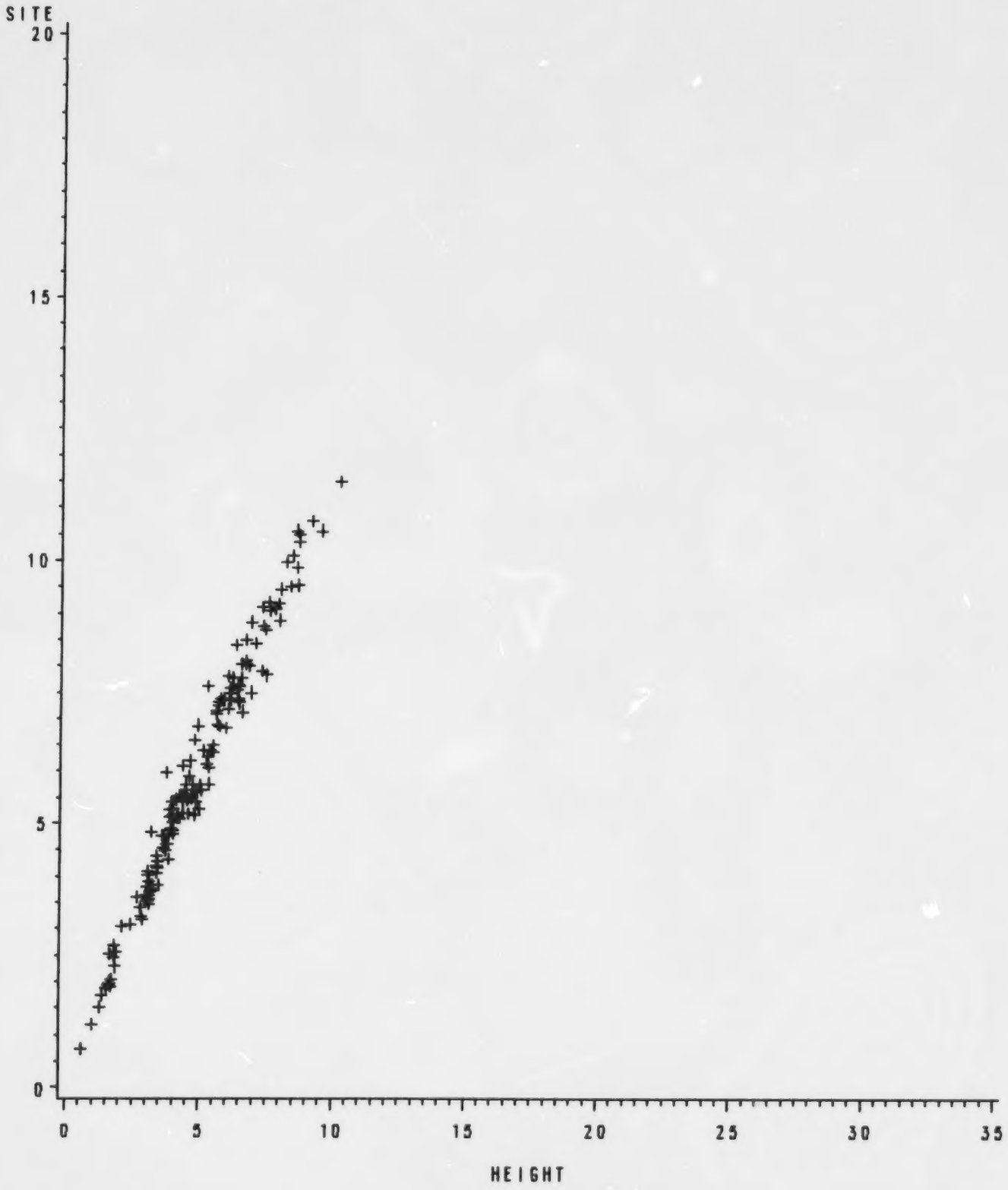
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 20 YRS



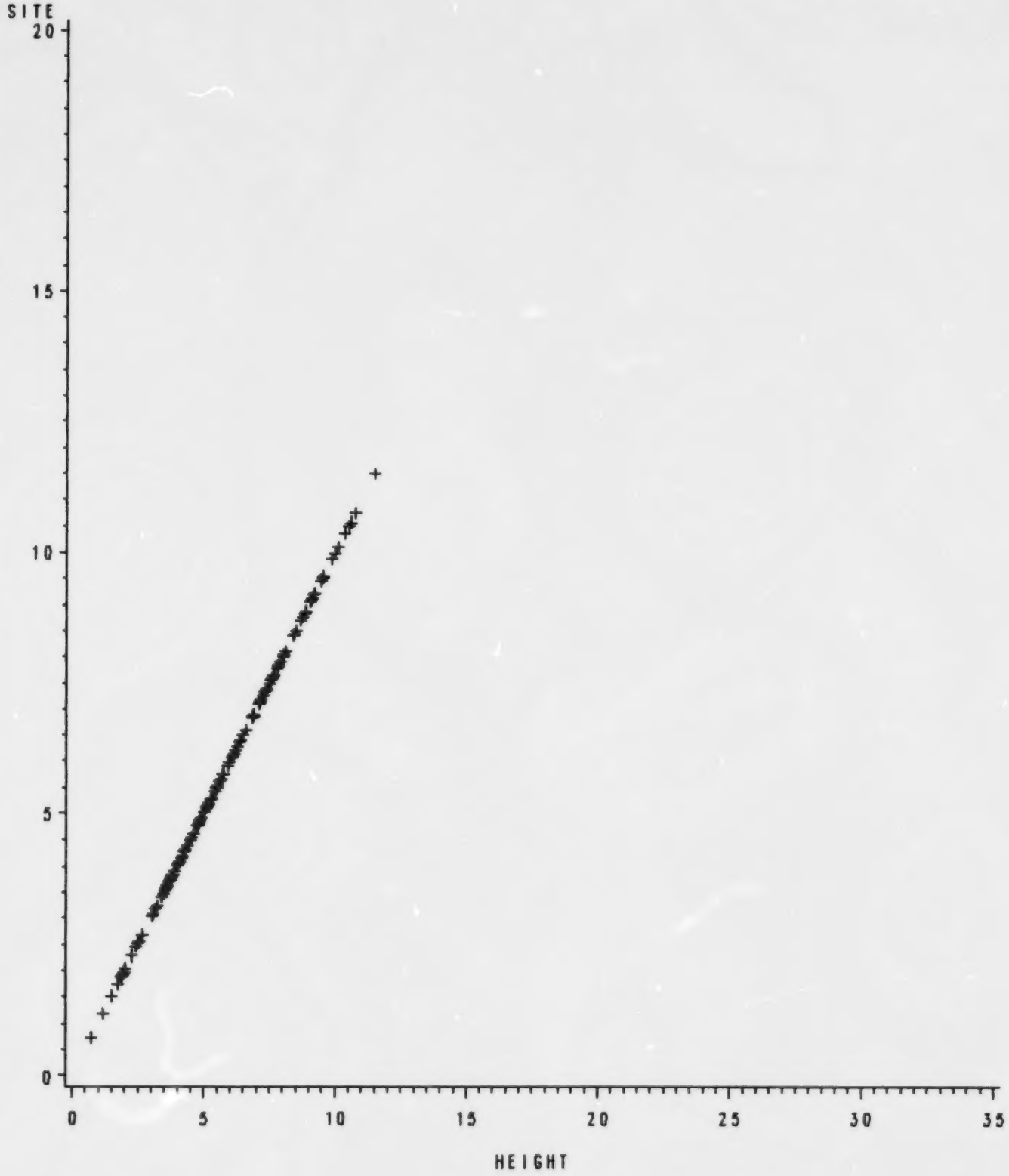
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 30 YRS



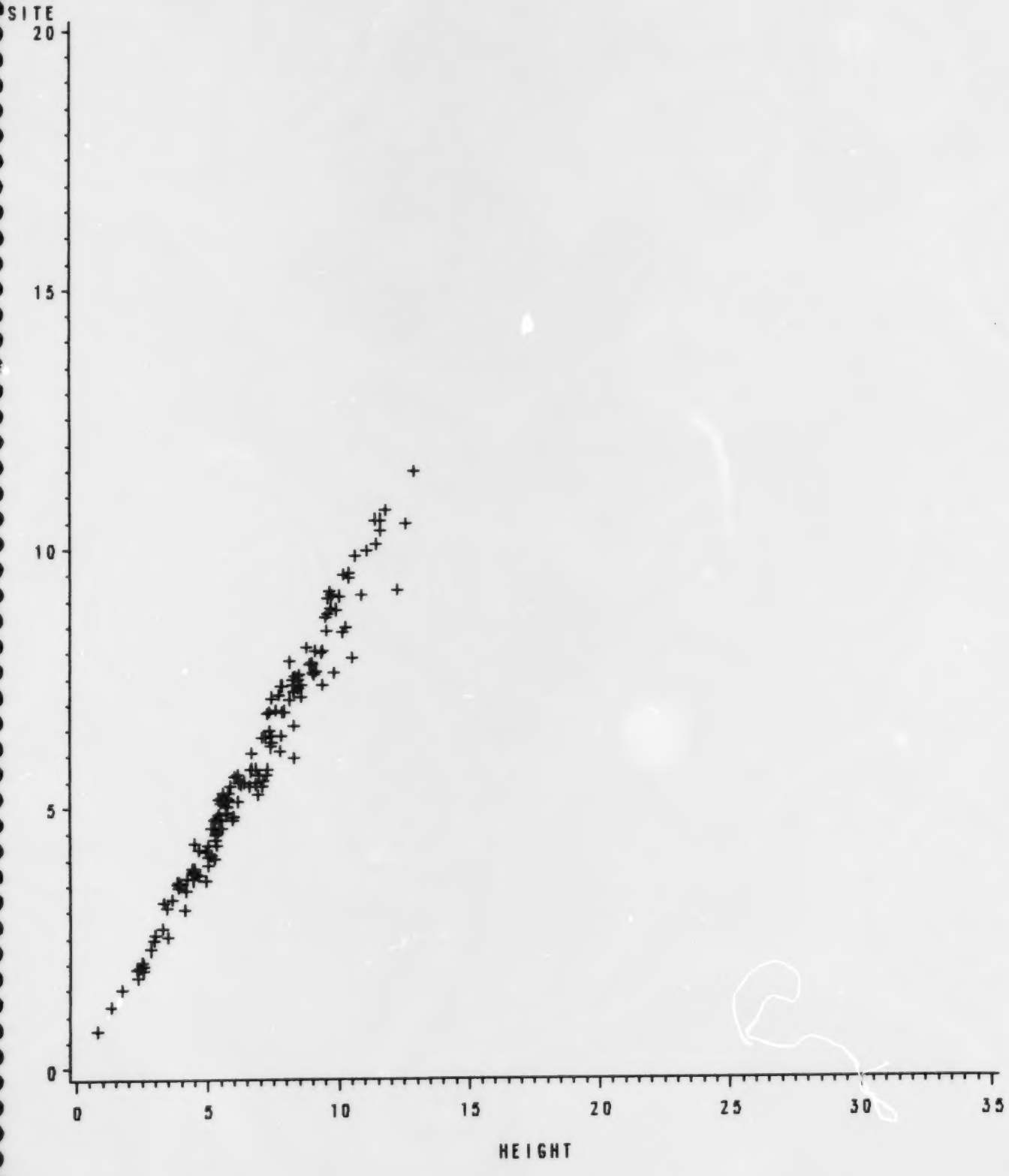
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 40 YRS



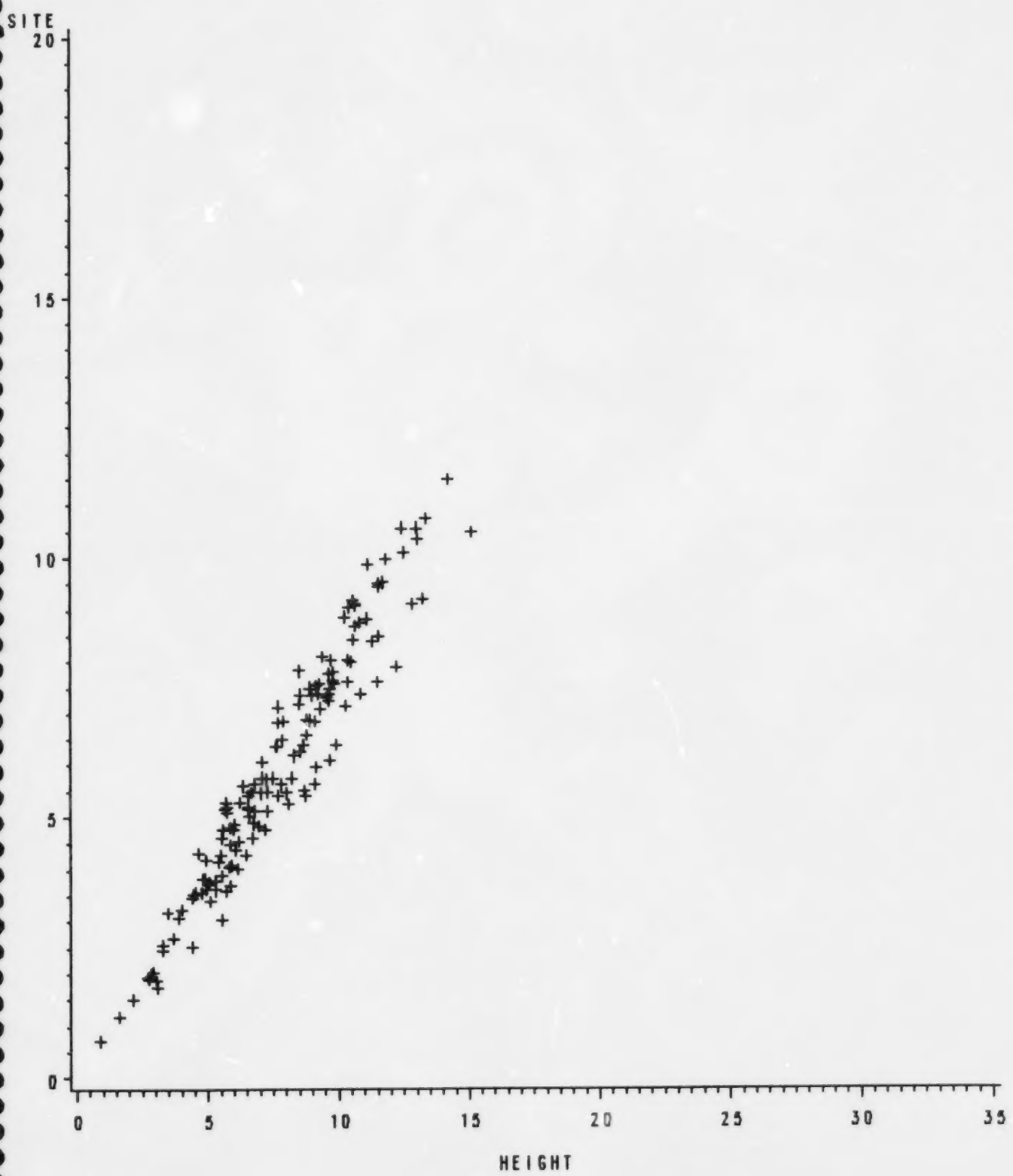
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 50 YRS



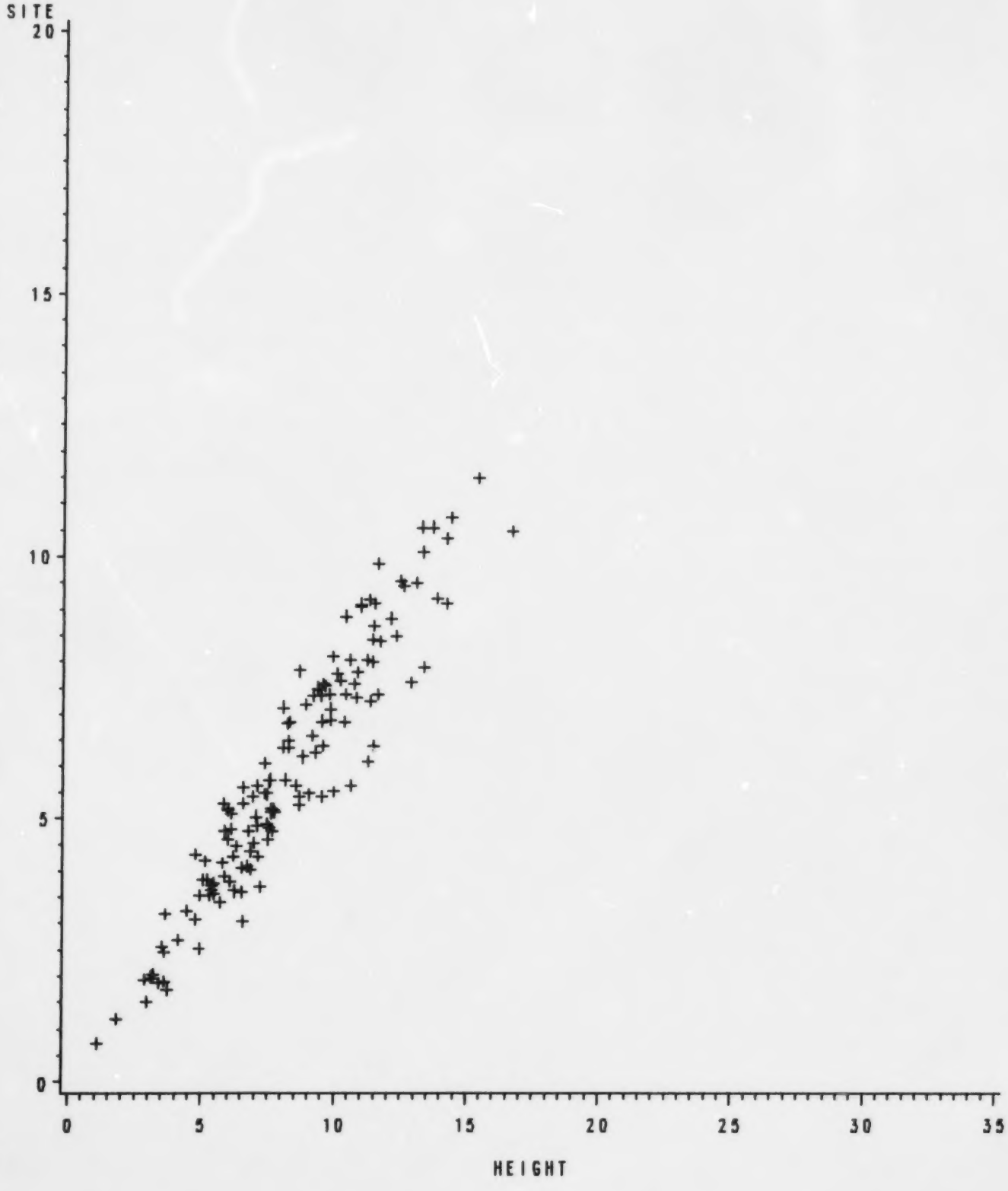
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 60 YRS



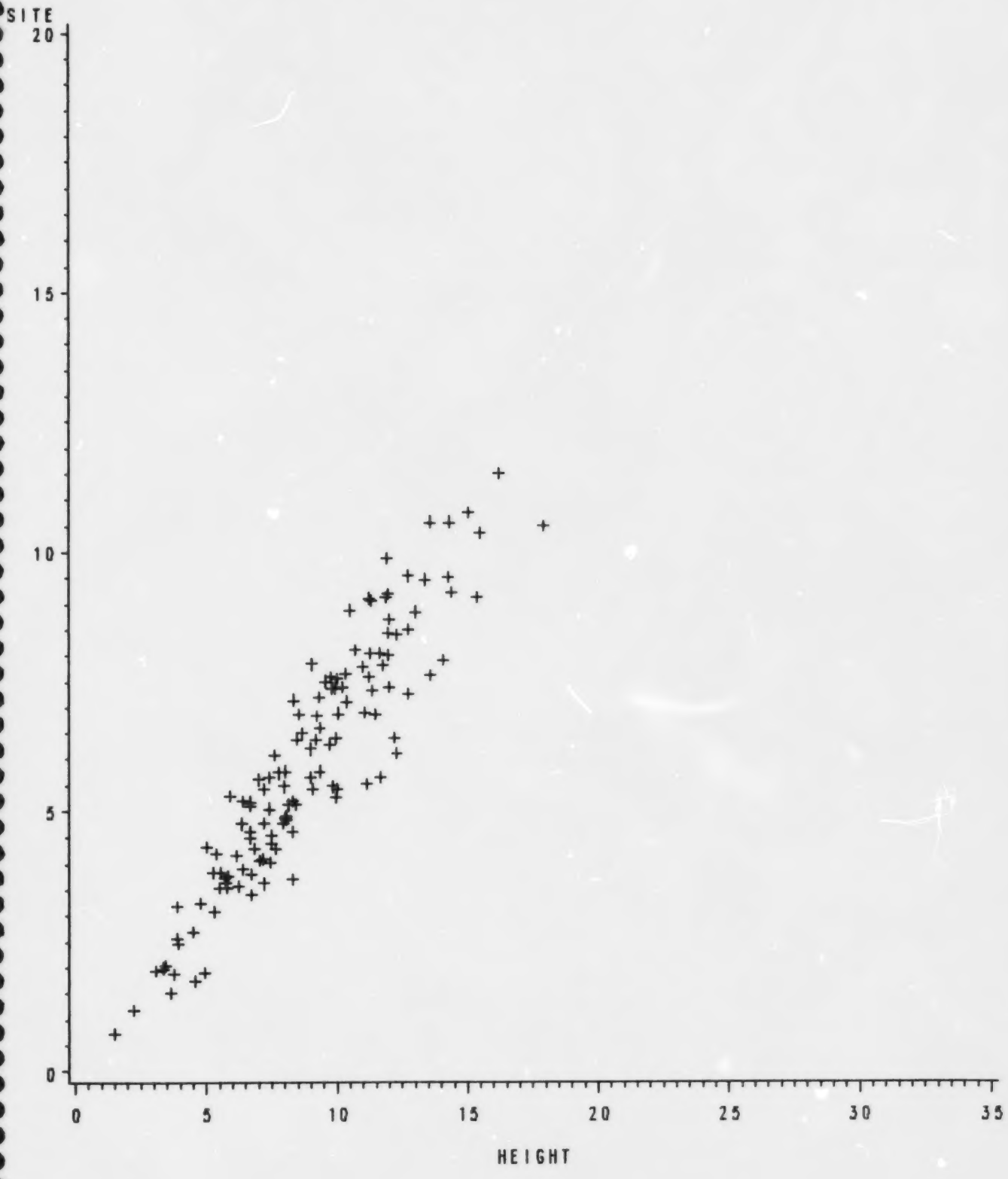
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 70 YRS



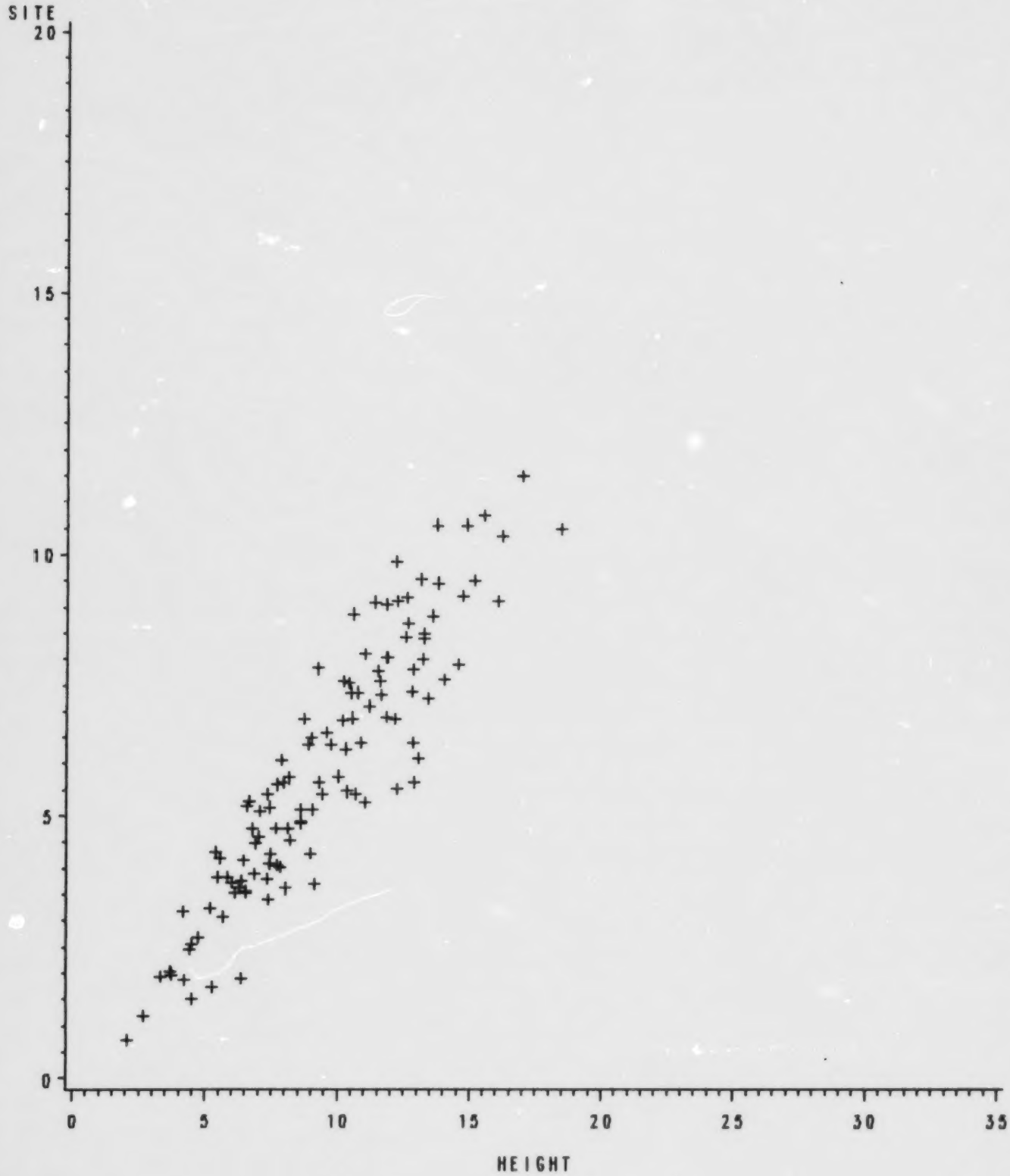
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 80 YRS



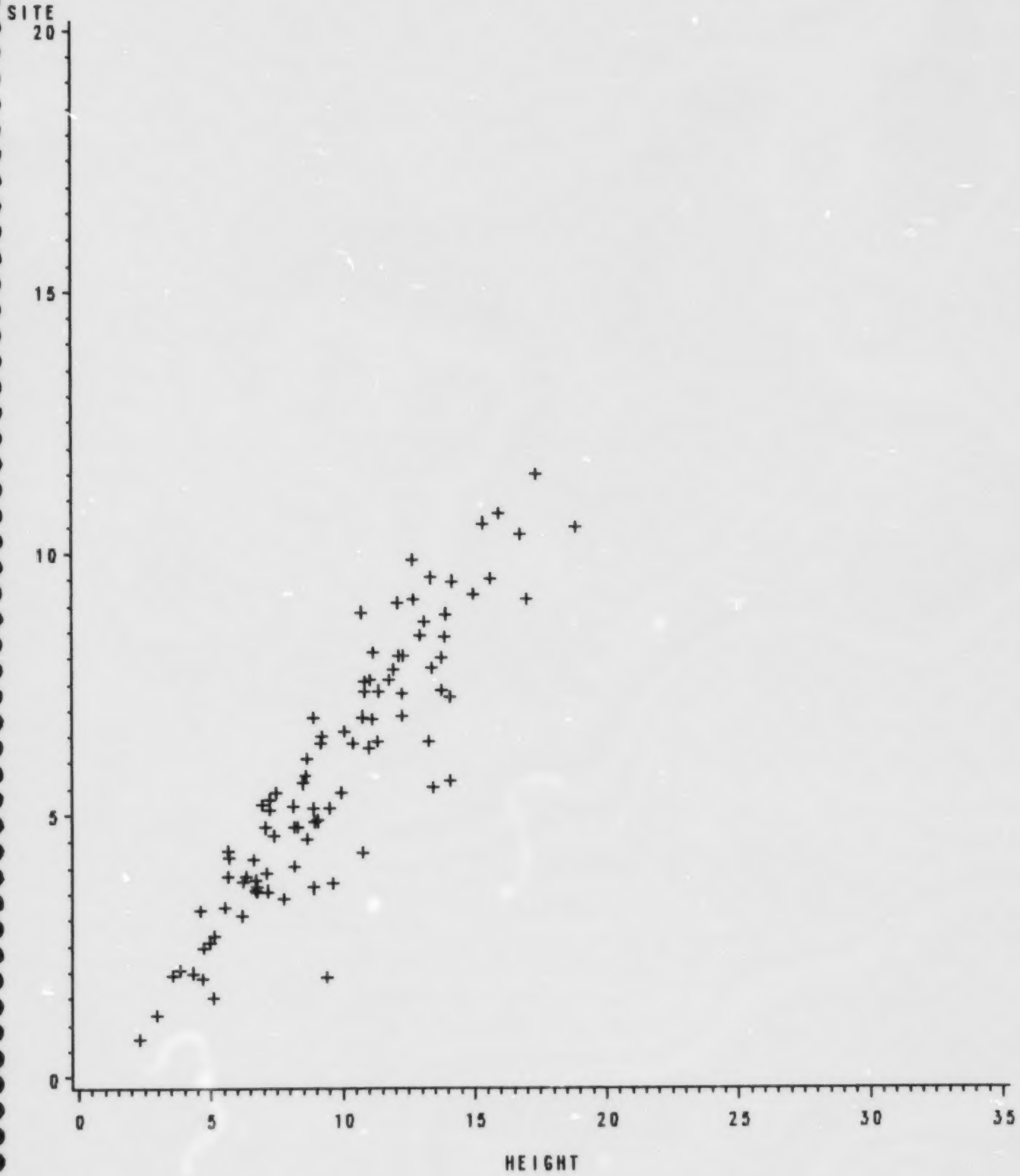
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 90 YRS



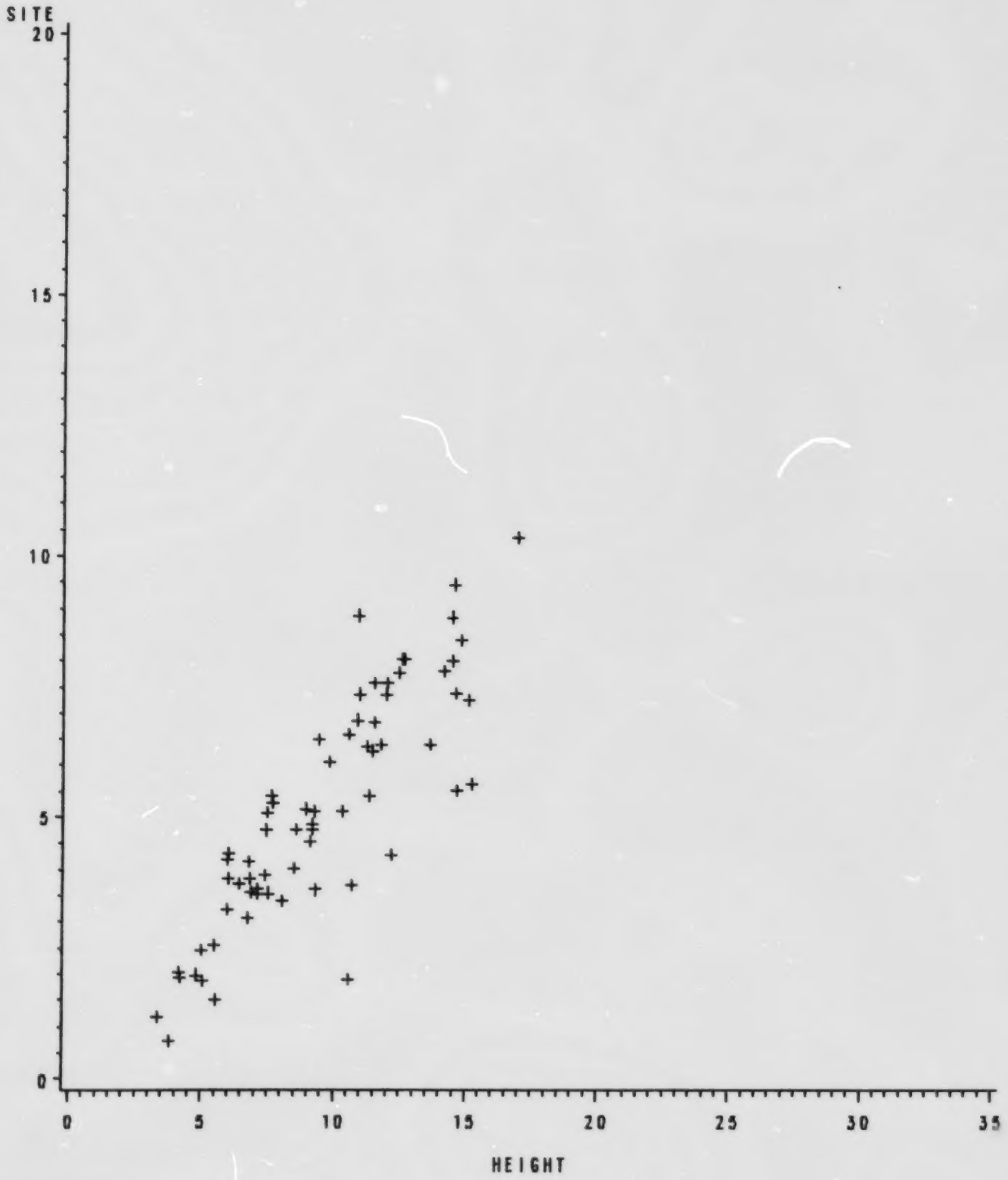
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 100 YRS



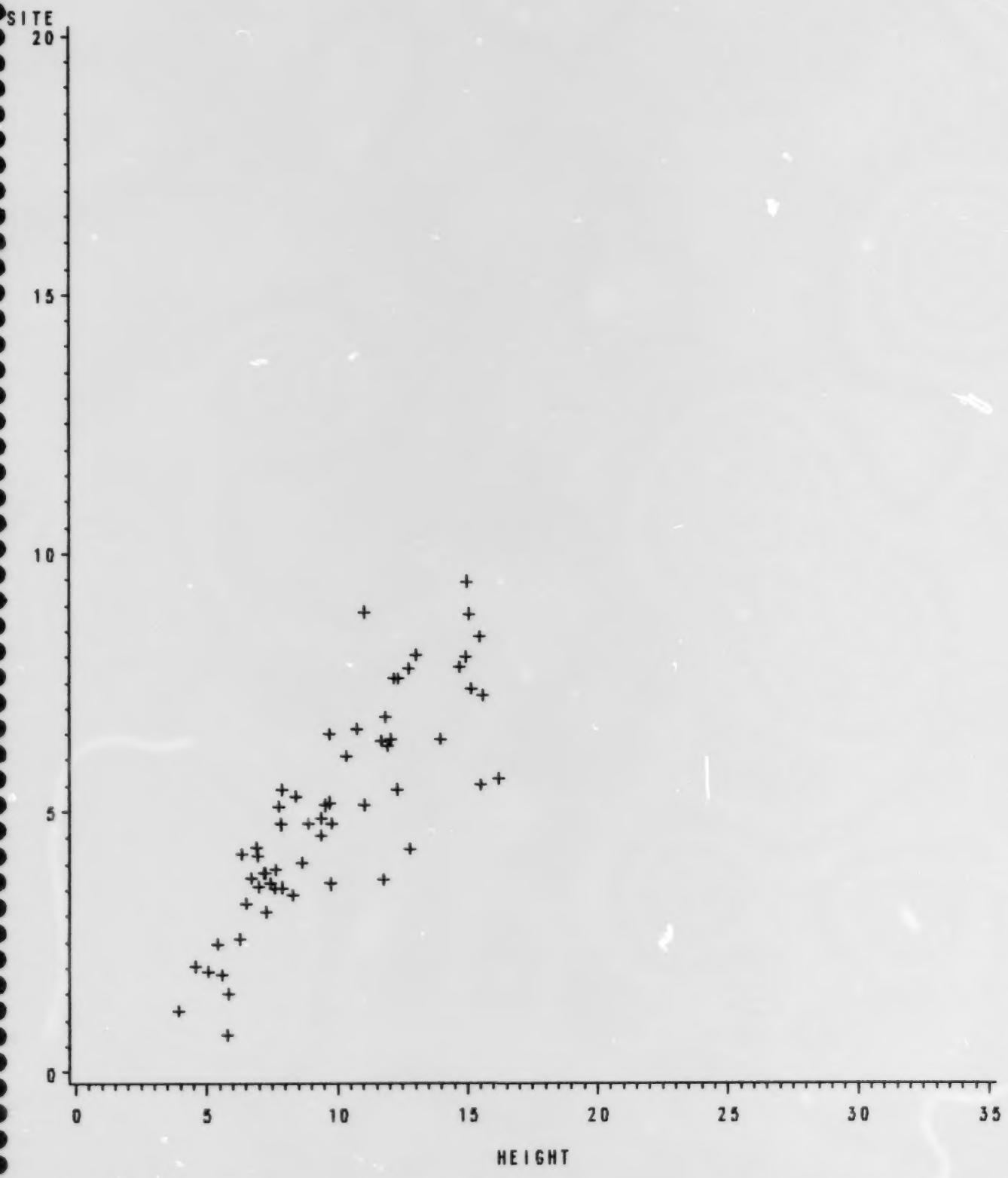
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 110 YRS



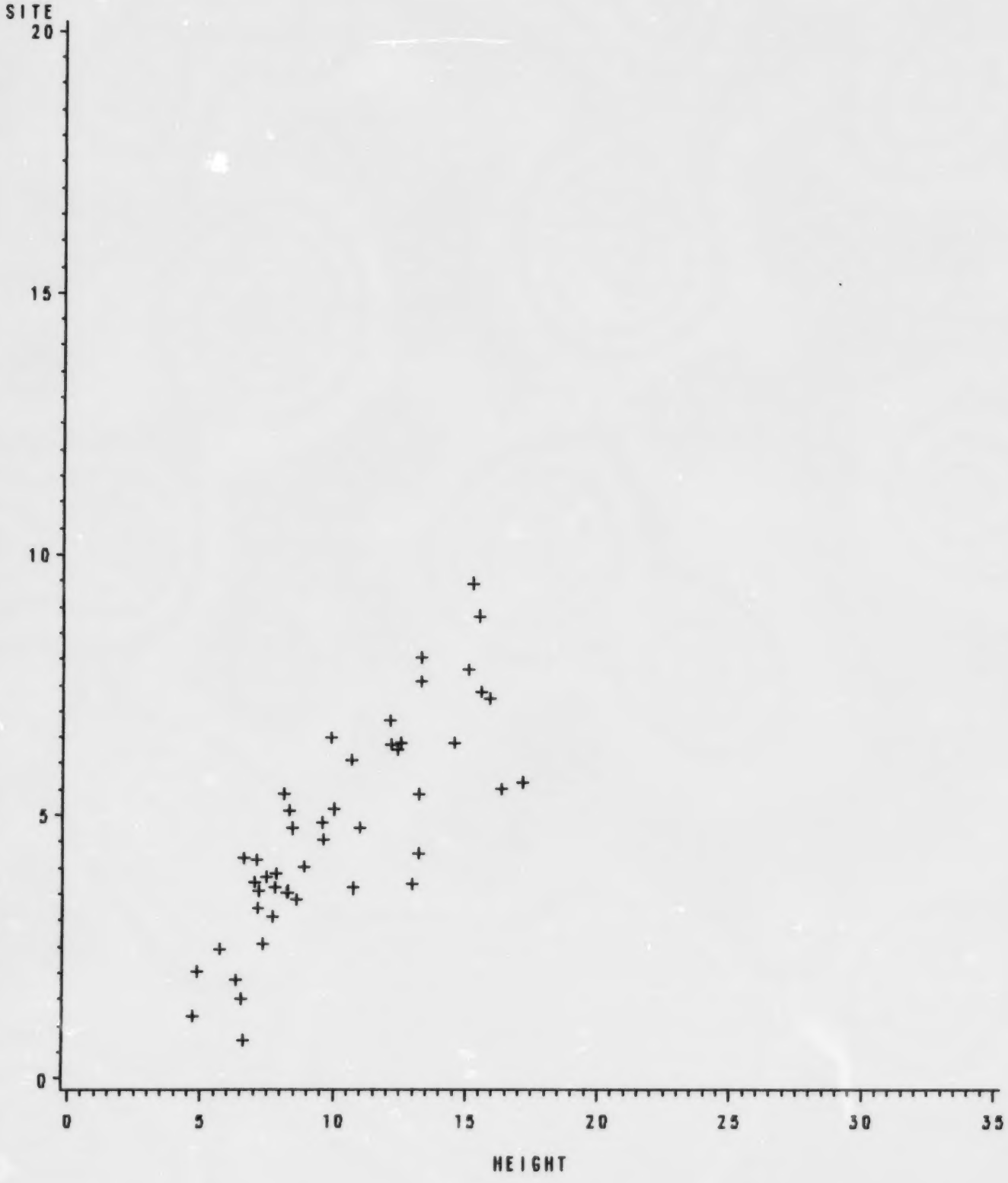
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 120 YRS



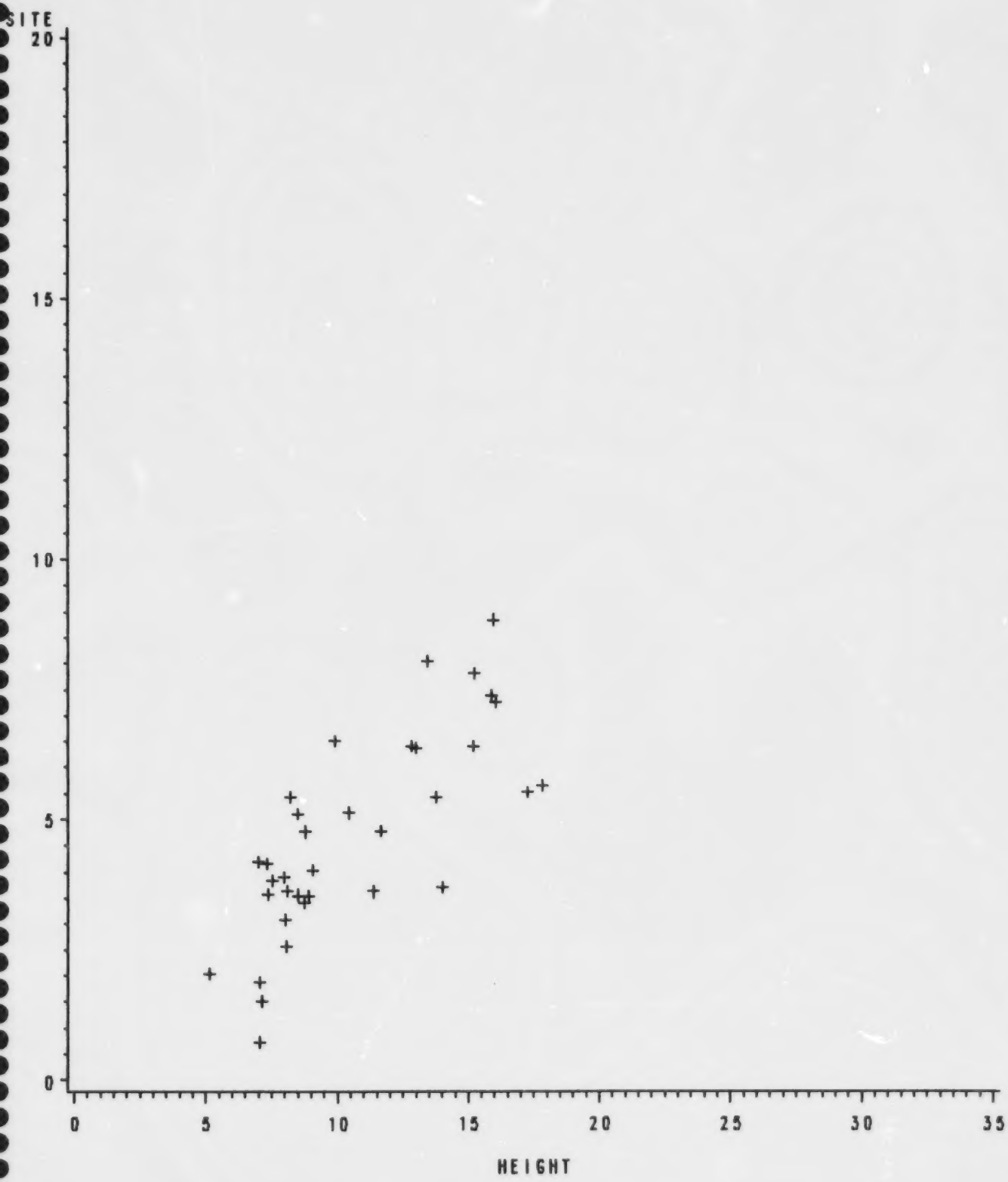
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 130 YRS



SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 140 YRS



SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 150 YRS



Model: MODEL1 - 10 YRS
Dependent Variable: SITE

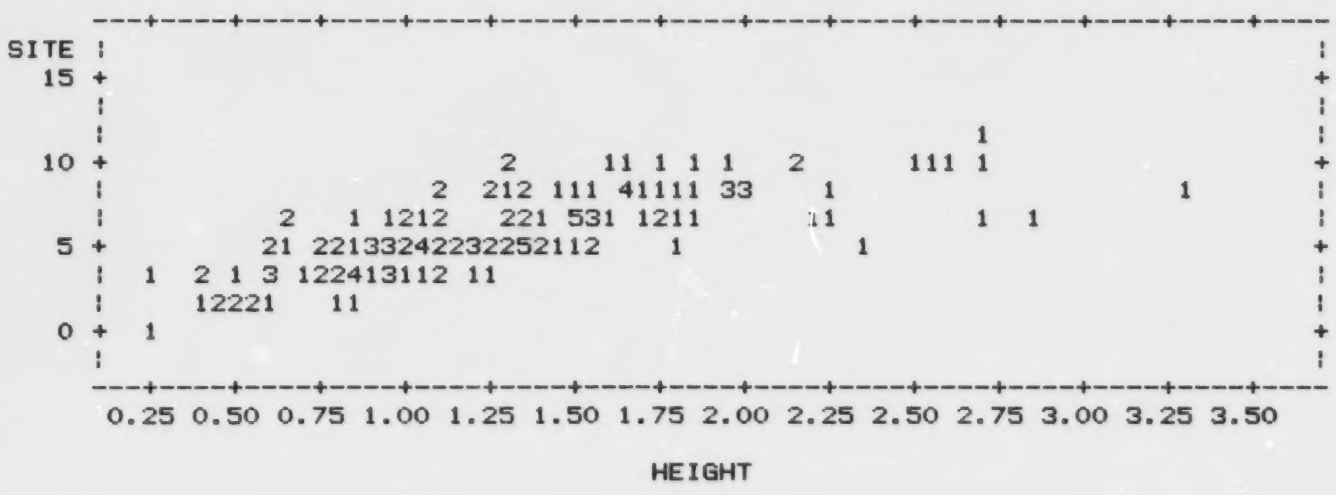
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	484.07285	484.07285	224.277	0.0001
Error	151	325.91442	2.15837		
C Total	152	809.98727			

Root MSE	1.46914	R-square	0.5976
Dep Mean	5.94601	Adj R-sq	0.5950
C.V.	24.70799		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for HO: Parameter=0	Prob > |T|
INTERCEP	1	1.910872	0.29445963	6.489	0.0001
HEIGHT	1	3.117434	0.20816379	14.976	0.0001



Model: MODEL1 - 20 YRS
Dependent Variable: SITE

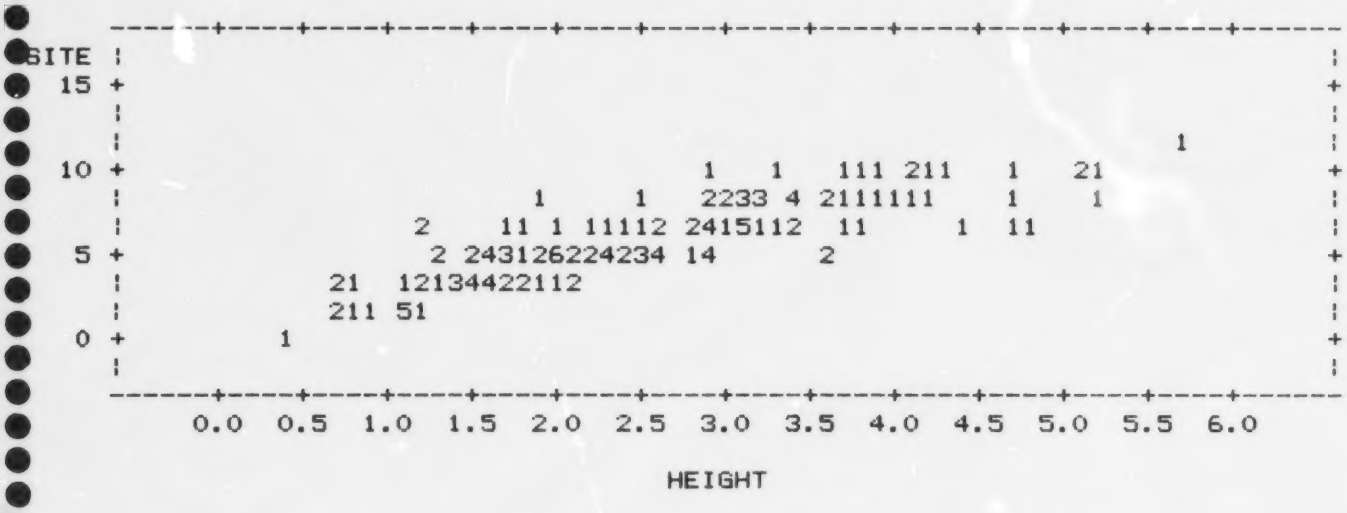
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	603.02826	603.02826	439.977	0.0001
Error	151	206.95901	1.37059		
C Total	152	809.98727			

Root MSE	1.17072	R-square	0.7445
Dep Mean	5.94601	Adj R-sq	0.7428
C.V.	19.68919		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.403968	0.23632027	5.941	0.0001
HEIGHT	1	1.787425	0.08521433	20.976	0.0001



Model: MODEL1 - 30 YRS
Dependent Variable: SITE

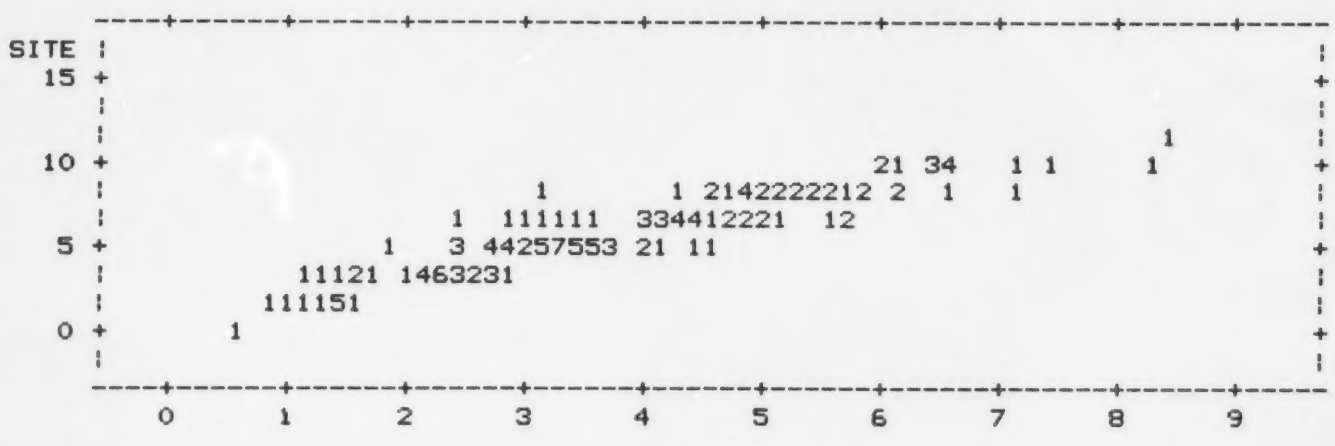
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	726.69082	726.69082	1317.347	0.0001
Error	151	83.29644	0.55163		
C Total	152	809.98727			

Root MSE	0.74272	R-square	0.8972
Dep Mean	5.94601	Adj R-sq	0.8965
C.V.	12.49105		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.855929	0.15255479	5.611	0.0001
HEIGHT	1	1.337288	0.03684468	36.295	0.0001



Model: MODEL1 - 40 YRS
Dependent Variable: SITE

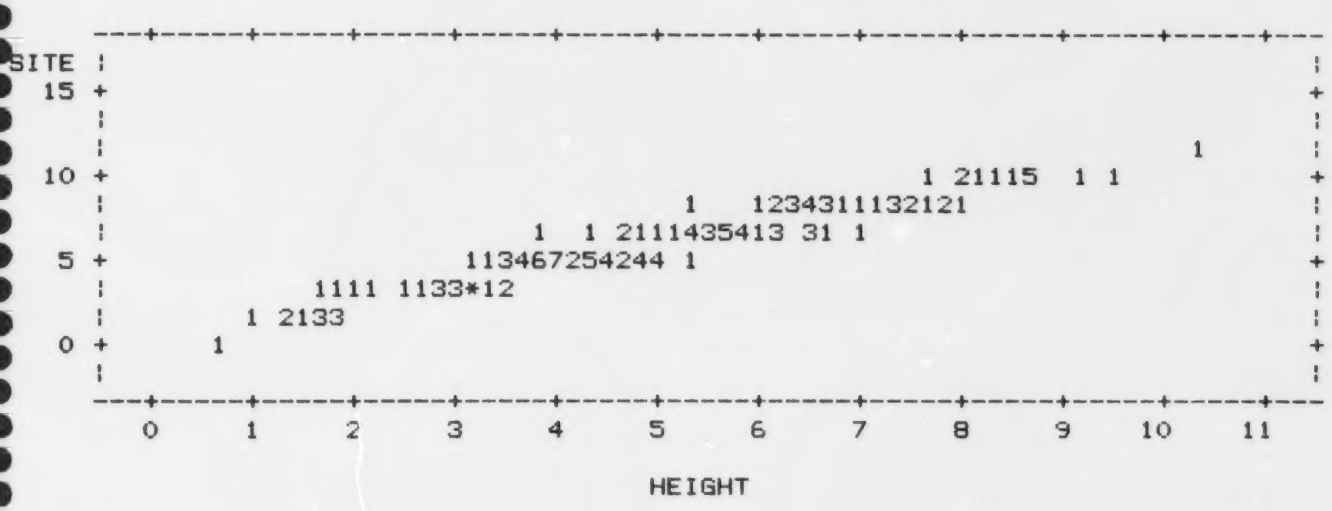
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	788.21849	788.21849	5467.510	0.0001
Error	151	21.76877	0.14416		
C Total	152	809.98727			

Root MSE	0.37969	R-square	0.9731
Dep Mean	5.94601	Adj R-sq	0.9729
C.V.	6.38561		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.373031	0.08138021	4.584	0.0001
HEIGHT	1	1.129494	0.01527528	73.943	0.0001



Model: MODEL1 - 50 YRS
Dependent Variable: SITE

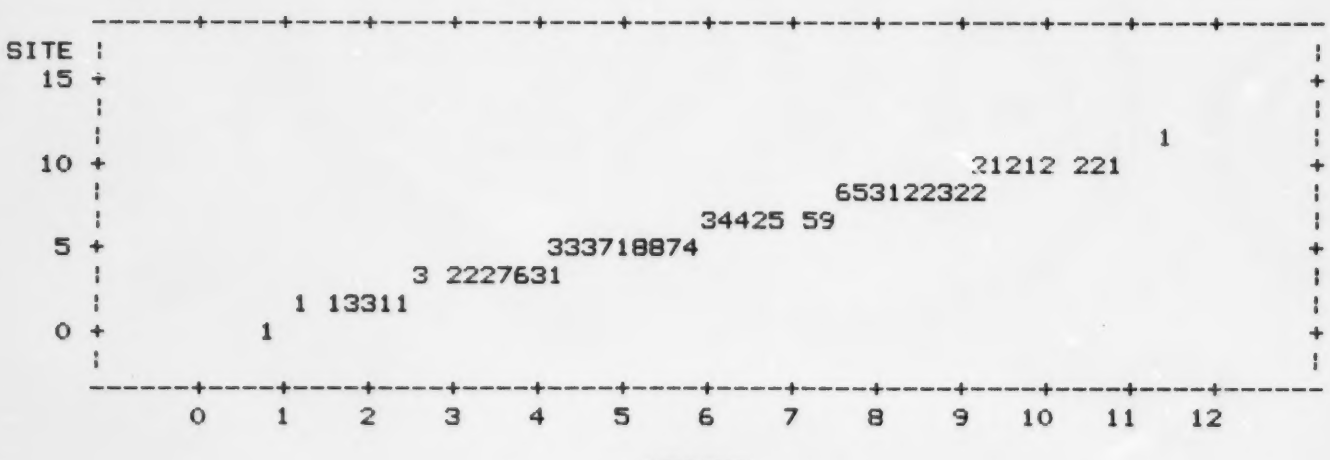
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	809.98727	809.98727	.	.
Error	151	0.00000	0.00000		
C Total	152	809.98727			

Root MSE	0.00000	R-square	1.0000
Dep Mean	5.94601	Adj R-sq	1.0000
C.V.	0.00000		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0	0.00000000	.	.
HEIGHT	1	1.000000	0.00000000	.	.



Model: MODEL1 - 60 YRS
Dependent Variable: SITE

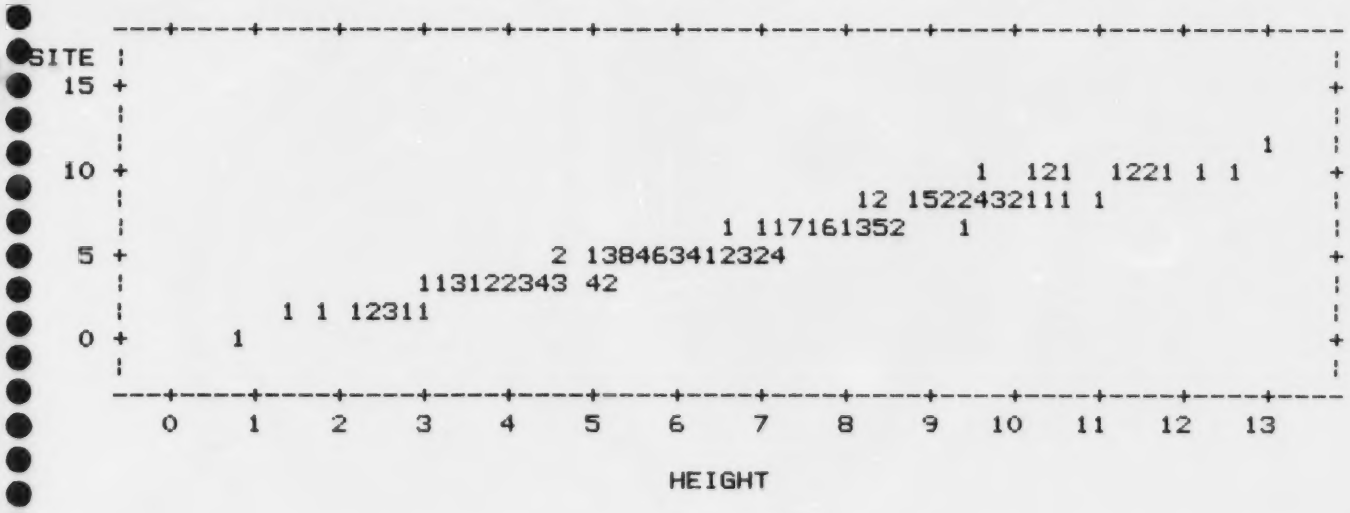
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	784.20930	784.20930	4869.719	0.0001
Error	147	23.67257	0.16104		
C Total	148	807.88188			

Root MSE	0.40130	R-square	0.9707
Dep Mean	5.93852	Adj R-sq	0.9705
C.V.	6.75749		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.138979	0.09308937	-1.493	0.1376
HEIGHT	1	0.885137	0.01268406	69.783	0.0001



Model: MODEL1 - 70 YRS
Dependent Variable: SITE

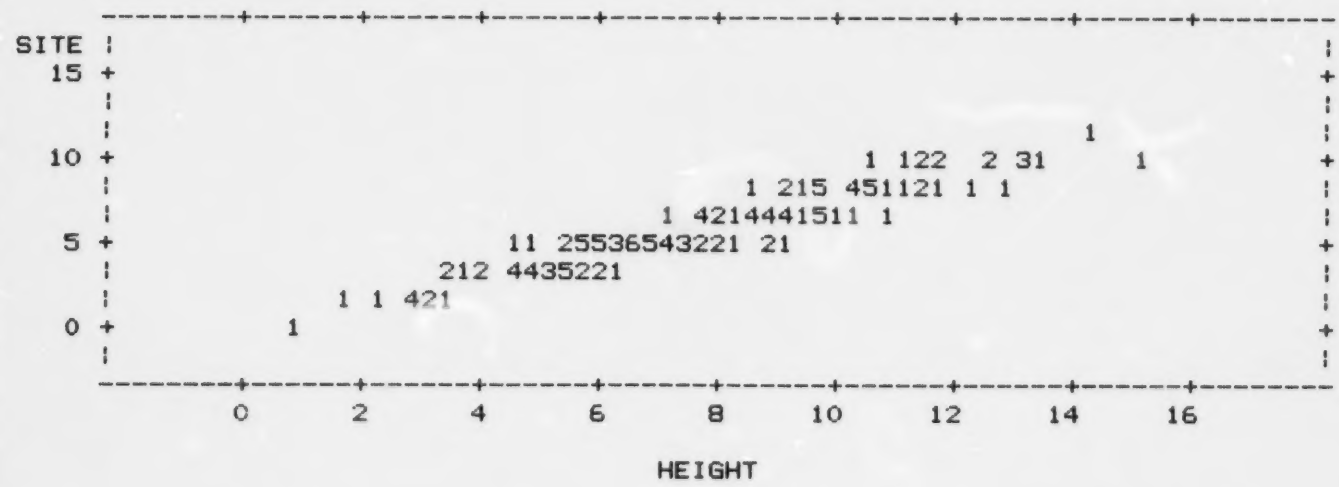
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	737.03010	737.03010	1978.447	0.0001
Error	145	54.01680	0.37253		
C Total	146	791.04690			

Root MSE	0.61035	R-square	0.9317
Dep Mean	5.95082	Adj R-sq	0.9312
C.V.	10.25661		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.115451	0.14537697	-0.794	0.4284
HEIGHT	1	0.785232	0.01765371	44.480	0.0001



Model: MODEL1 - 80 YRS
Dependent Variable: SITE

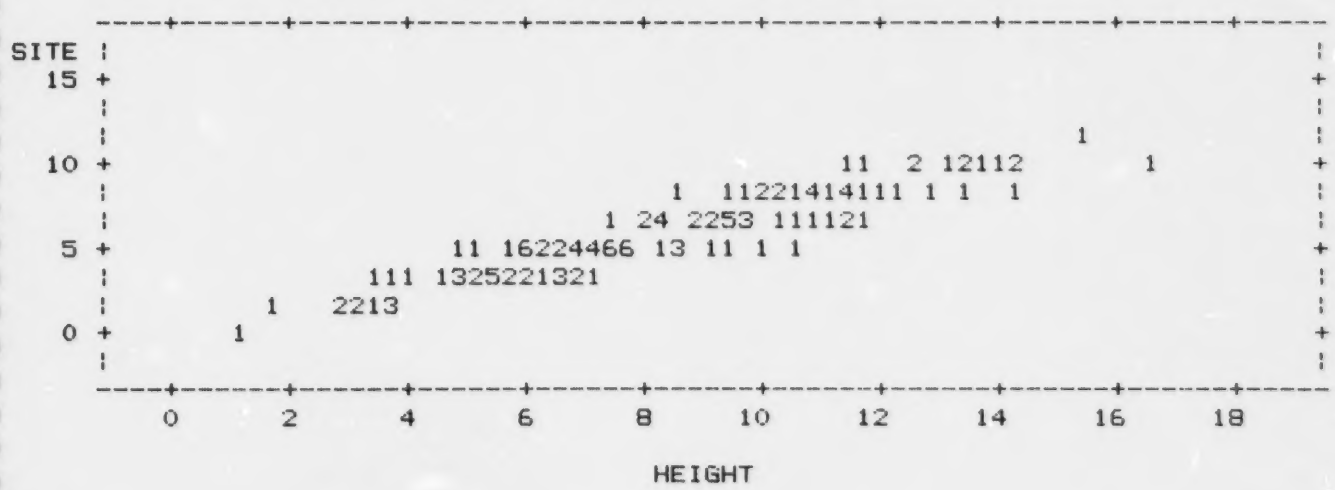
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	674.83458	674.83458	1165.802	0.0001
Error	136	78.72481	0.57886		
C Total	137	753.55938			

Root MSE	0.76083	R-square	0.8955
Dep Mean	5.89152	Adj R-sq	0.8948
C.V.	12.91394		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.105210	0.18719251	-0.562	0.5750
HEIGHT	1	0.722820	0.02116984	34.144	0.0001



Model: MODEL1 - 90 YRS
Dependent Variable: SITE

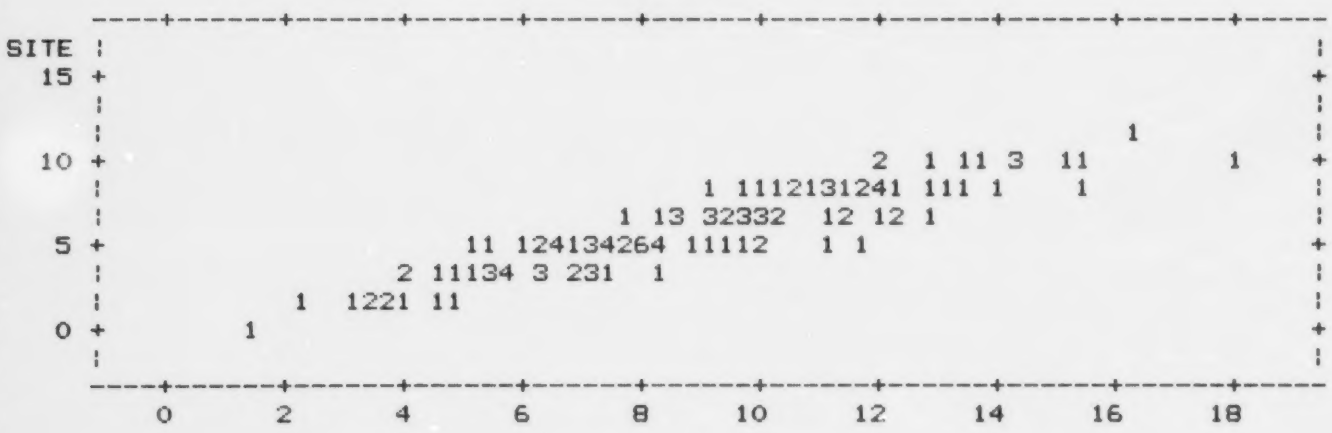
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	609.97855	609.97855	801.648	0.0001
Error	127	96.63506	0.76091		
C Total	128	706.61361			

Root MSE	0.87230	R-square	0.8632
Dep Mean	5.93465	Adj R-sq	0.8622
C.V.	14.69841		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for HO: Parameter=0	Prob > |T|
INTERCEP	1	-0.121821	0.22727807	-0.536	0.5929
HEIGHT	1	0.680757	0.02404366	28.313	0.0001



Model: MODEL1 - 100 YRS
Dependent Variable: SITE

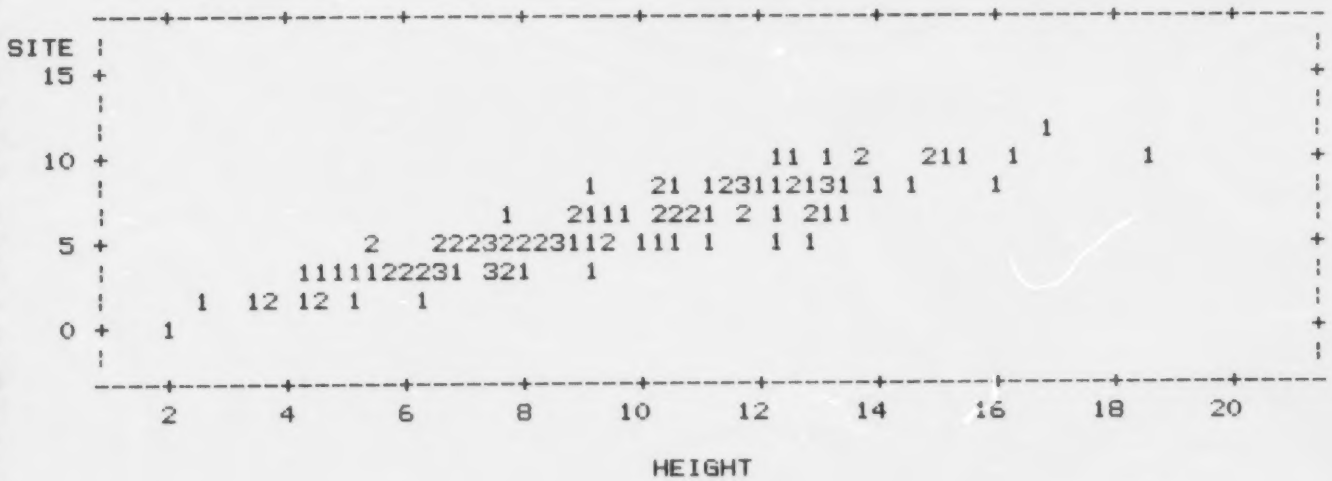
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	580.46565	580.46565	609.839	0.0001
Error	114	108.50903	0.95183		
C Total	115	688.97468			

Root MSE	0.97562	R-square	0.8425
Dep Mean	5.92362	Adj R-sq	0.8411
C.V.	16.46999		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.269510	0.26664368	-1.011	0.3143
HEIGHT	1	0.654880	0.02651880	24.695	0.0001



Model: MODEL1 - 110 YRS
Dependent Variable: SITE

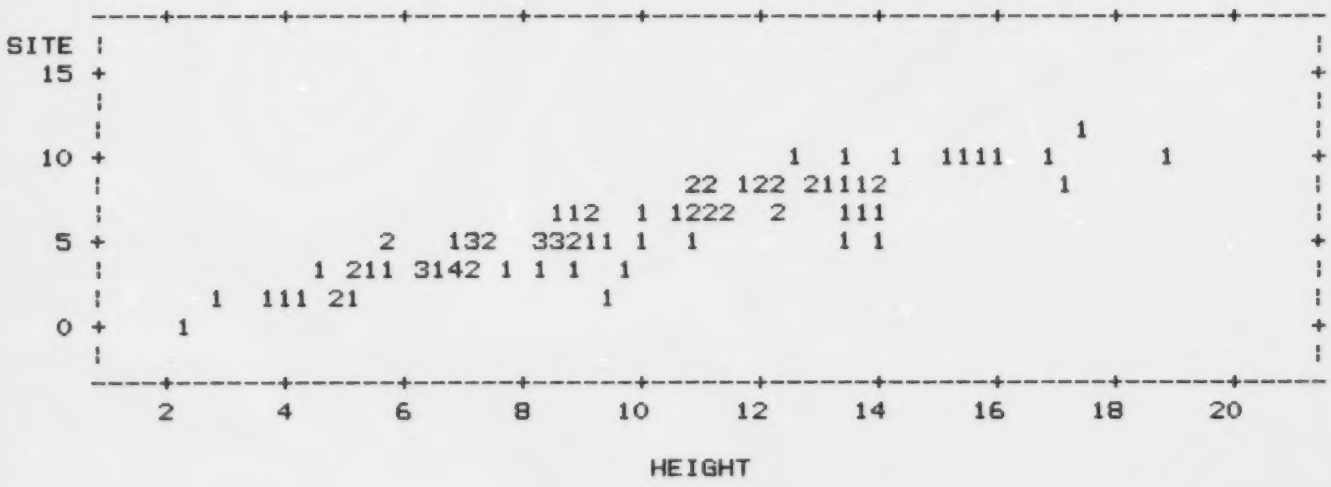
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	491.61705	491.61705	450.307	0.0001
Error	92	100.43994	1.09174		
C Total	93	592.05699			

Root MSE	1.04486	R-square	0.8304
Dep Mean	5.85819	Adj R-sq	0.8285
C.V.	17.83593		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.342963	0.31146445	-1.101	0.2737
HEIGHT	1	0.634603	0.02990530	21.220	0.0001



Model: MODEL1 - 120 YRS
Dependent Variable: SITE

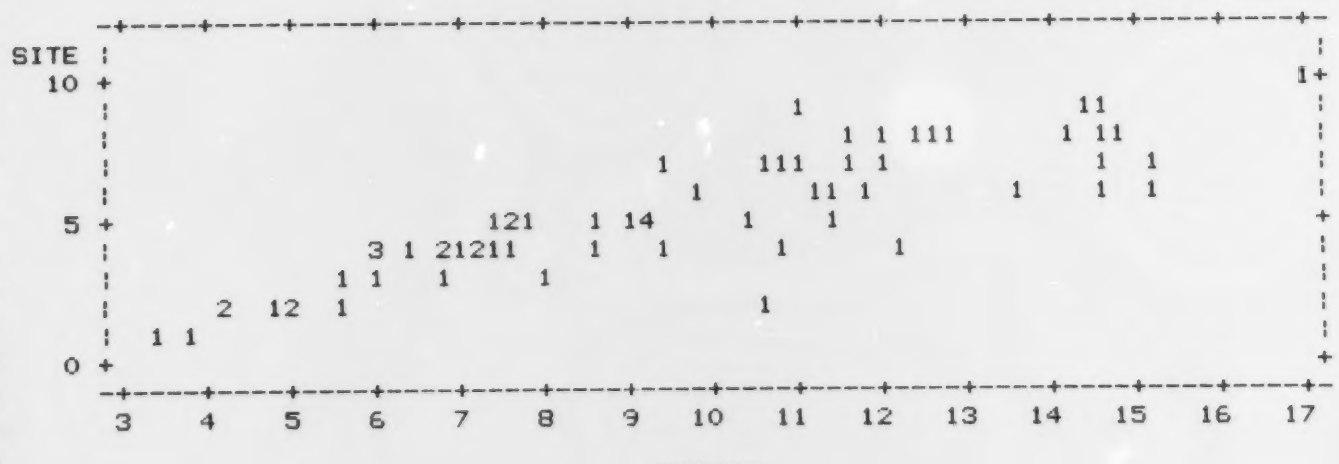
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	238.09560	238.09560	182.175	0.0001
Error	65	84.95247	1.30696		
C Total	66	323.04807			

Root MSE	1.14322	R-square	0.7370
Dep Mean	5.16463	Adj R-sq	0.7330
C.V.	22.13565		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.228608	0.42328711	-0.540	0.5910
HEIGHT	1	0.564648	0.04183442	13.497	0.0001



Model: MODEL1 - 130 YRS
Dependent Variable: SITE

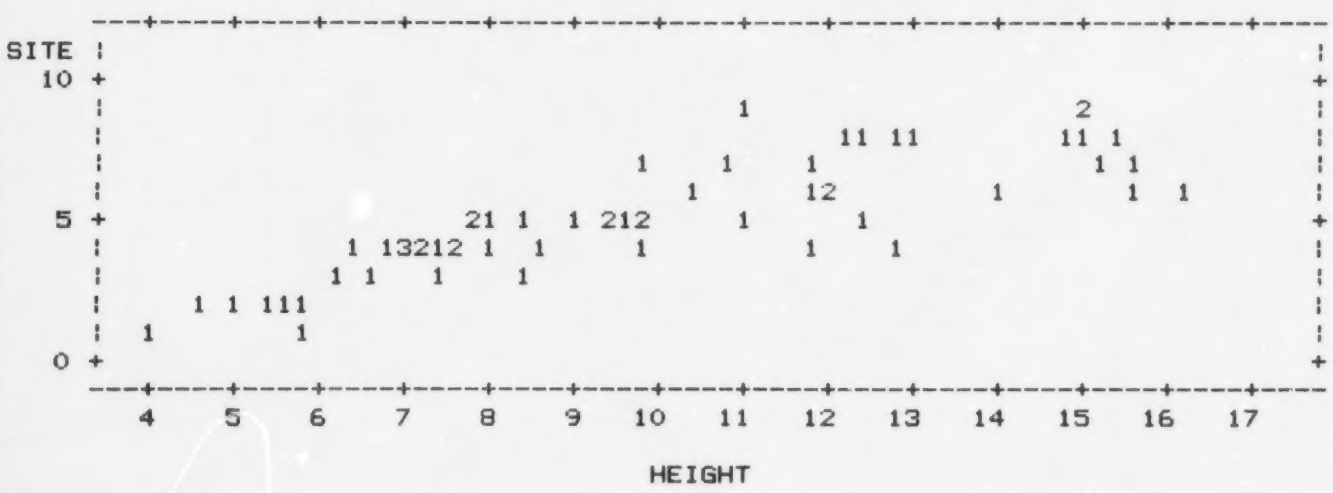
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	180.25389	180.25389	143.330	0.0001
Error	58	72.94159	1.25761		
C Total	59	253.19549			

Root MSE	1.12143	R-square	0.7119
Dep Mean	5.03550	Adj R-sq	0.7069
C.V.	22.27055		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.182270	0.45924637	-0.397	0.6929
HEIGHT	1	0.529535	0.04423089	11.972	0.0001



Model: MODEL1 - 140 YRS
Dependent Variable: SITE

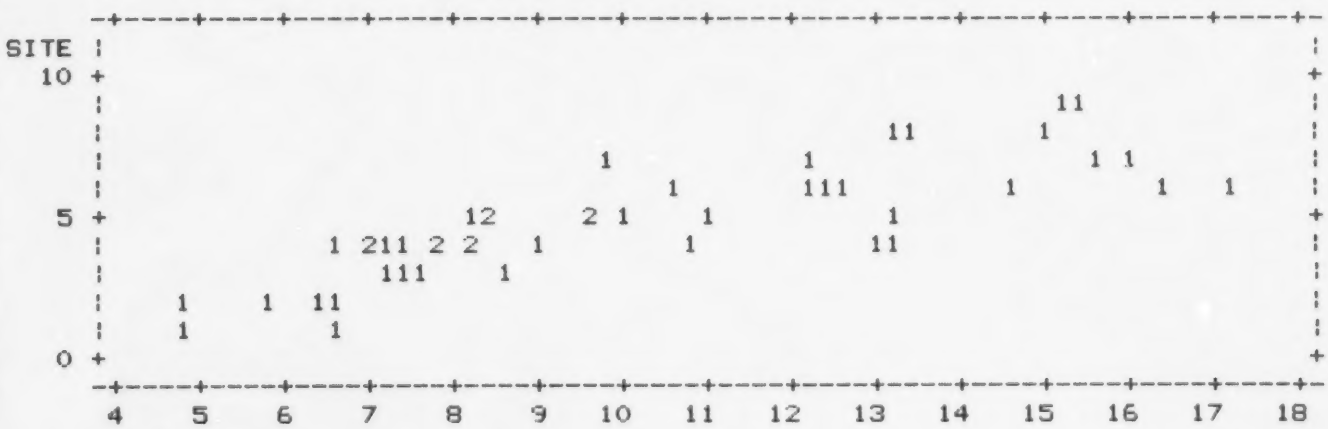
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	124.61024	124.61024	90.049	0.0001
Error	45	62.27150	1.38381		
C Total	46	186.88173			

Root MSE	1.17635	R-square	0.6668
Dep Mean	4.77404	Adj R-sq	0.6594
C.V.	24.64065		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.137445	0.54527811	-0.252	0.8021
HEIGHT	1	0.482081	0.05080214	9.489	0.0001



Model: MODEL1 - 150 YRS
Dependent Variable: SITE

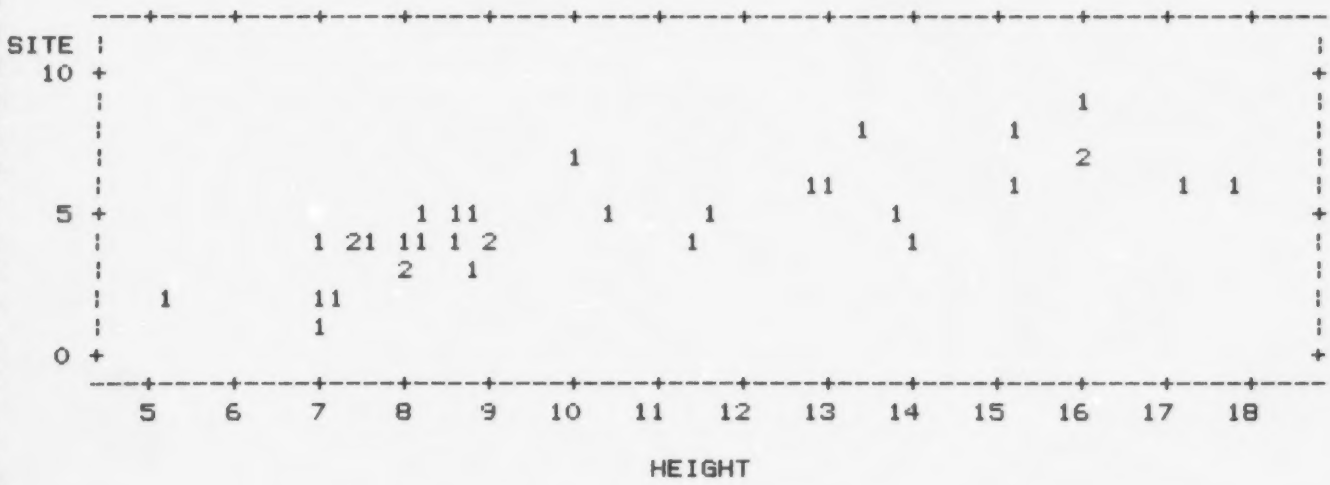
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	74.07244	74.07244	46.719	0.0001
Error	33	52.32143	1.58550		
C Total	34	126.39387			

Root MSE	1.25917	R-square	0.5860
Dep Mean	4.68086	Adj R-sq	0.5735
C.V.	26.90032		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.268332	0.67974807	0.395	0.6956
HEIGHT	1	0.414222	0.06060204	6.835	0.0001



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EEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS11.DAT

DATASET  BS11  TREE =  835  SITE INDEX =   8.70  AGE 1.3 M =  23
DATASET  BS11  TREE =  838  SITE INDEX =   6.74  AGE 1.3 M =  19
DATASET  BS11  TREE =  839  SITE INDEX =   7.72  AGE 1.3 M =  20
DATASET  BS11  TREE =  840  SITE INDEX =  11.87  AGE 1.3 M =   8
DATASET  BS11  TREE =  841  SITE INDEX =  10.43  AGE 1.3 M =  12
DATASET  BS11  TREE =  842  SITE INDEX =   9.20  AGE 1.3 M =  18
DATASET  BS11  TREE =  843  SITE INDEX =   9.73  AGE 1.3 M =  11
DATASET  BS11  TREE =  844  SITE INDEX =  10.35  AGE 1.3 M =  11
DATASET  BS11  TREE =  845  SITE INDEX =   9.81  AGE 1.3 M =  20
DATASET  BS11  TREE =  846  SITE INDEX =  10.00  AGE 1.3 M =  13
DATASET  BS11  TREE =  847  SITE INDEX =   8.19  AGE 1.3 M =   8
DATASET  BS11  TREE =  848  SITE INDEX =   8.96  AGE 1.3 M =  27
DATASET  BS11  TREE =  849  SITE INDEX =   8.80  AGE 1.3 M =  14
DATASET  BS11  TREE =  850  SITE INDEX =   6.19  AGE 1.3 M =  10
DATASET  BS11  TREE =  851  SITE INDEX =   8.62  AGE 1.3 M =   9
DATASET  BS11  TREE =  859  SITE INDEX =   6.44  AGE 1.3 M =  14
DATASET  BS11  TREE =  860  SITE INDEX =   6.06  AGE 1.3 M =  13
DATASET  BS11  TREE =  861  SITE INDEX =   7.07  AGE 1.3 M =  26
DATASET  BS11  TREE =  862  SITE INDEX =   7.81  AGE 1.3 M =   9
DATASET  BS11  TREE =  863  SITE INDEX =   7.28  AGE 1.3 M =  33
DATASET  BS11  TREE =  865  SITE INDEX =   5.62  AGE 1.3 M =  15
DATASET  BS11  TREE =  866  SITE INDEX =   6.48  AGE 1.3 M =  17
DATASET  BS11  TREE =  868  SITE INDEX =   5.13  AGE 1.3 M =  16
DATASET  BS11  TREE =  869  SITE INDEX =   6.61  AGE 1.3 M =  13
DATASET  BS11  TREE =  870  SITE INDEX =   3.19  AGE 1.3 M =  20
DATASET  BS11  TREE =  873  SITE INDEX =   5.91  AGE 1.3 M =  18

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS12.DAT

DATASET  BS12  TREE =  699   SITE INDEX =   7.50     AGE 1.3 M =  30
DATASET  BS12  TREE =  700   SITE INDEX =   7.90     AGE 1.3 M =  23
DATASET  BS12  TREE =  701   SITE INDEX =   8.18     AGE 1.3 M =  33
DATASET  BS12  TREE =  702   SITE INDEX =   6.12     AGE 1.3 M =  24
DATASET  BS12  TREE =  703   SITE INDEX =   4.93     AGE 1.3 M =  31
DATASET  BS12  TREE =  705   SITE INDEX =   4.55     AGE 1.3 M =  32
DATASET  BS12  TREE =  712   SITE INDEX =   6.08     AGE 1.3 M =  13
DATASET  BS12  TREE =  713   SITE INDEX =   4.85     AGE 1.3 M =  21
DATASET  BS12  TREE =  714   SITE INDEX =   5.59     AGE 1.3 M =  25
DATASET  BS12  TREE =  715   SITE INDEX =   9.41     AGE 1.3 M =  11
DATASET  BS12  TREE =  716   SITE INDEX =   6.17     AGE 1.3 M =  16
DATASET  BS12  TREE =  717   SITE INDEX =   8.89     AGE 1.3 M =  16
DATASET  BS12  TREE =  719   SITE INDEX =   7.37     AGE 1.3 M =  22
DATASET  BS12  TREE =  720   SITE INDEX =   8.14     AGE 1.3 M =  19
DATASET  BS12  TREE =  721   SITE INDEX =   5.84     AGE 1.3 M =  17
DATASET  BS12  TREE =  722   SITE INDEX =   9.34     AGE 1.3 M =  10
DATASET  BS12  TREE =  724   SITE INDEX =   6.42     AGE 1.3 M =  18
DATASET  BS12  TREE =  725   SITE INDEX =  10.17     AGE 1.3 M =  21
DATASET  BS12  TREE =  726   SITE INDEX =   7.59     AGE 1.3 M =  24
DATASET  BS12  TREE =  727   SITE INDEX =   5.14     AGE 1.3 M =  17
DATASET  BS12  TREE =  729   SITE INDEX =  10.76     AGE 1.3 M =  15
DATASET  BS12  TREE =  733   SITE INDEX =   9.12     AGE 1.3 M =  15
DATASET  BS12  TREE =  734   SITE INDEX =   7.72     AGE 1.3 M =  15
DATASET  BS12  TREE =  735   SITE INDEX =   6.91     AGE 1.3 M =  14
DATASET  BS12  TREE =  736   SITE INDEX =   5.92     AGE 1.3 M =  11
DATASET  BS12  TREE =  737   SITE INDEX =   6.51     AGE 1.3 M =   8
DATASET  BS12  TREE =  738   SITE INDEX =   5.06     AGE 1.3 M =  13
DATASET  BS12  TREE =  739   SITE INDEX =   8.67     AGE 1.3 M =  10
DATASET  BS12  TREE =  740   SITE INDEX =   8.85     AGE 1.3 M =  10
DATASET  BS12  TREE =  741   SITE INDEX =   7.04     AGE 1.3 M =  13
DATASET  BS12  TREE =  742   SITE INDEX =   9.13     AGE 1.3 M =  21
DATASET  BS12  TREE =  743   SITE INDEX =   8.17     AGE 1.3 M =  10

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS2.DAT

DATASET  BS2.  TREE =  001   SITE INDEX =   9.35    AGE 1.3 M =   7
DATASET  BS2.  TREE =  003   SITE INDEX =   8.67    AGE 1.3 M =  13
DATASET  BS2.  TREE =  019   SITE INDEX =   6.48    AGE 1.3 M =  27
DATASET  BS2.  TREE =  020   SITE INDEX =   8.41    AGE 1.3 M =  14
DATASET  BS2.  TREE =  021   SITE INDEX =   6.79    AGE 1.3 M =  25
DATASET  BS2.  TREE =  022   SITE INDEX =   6.78    AGE 1.3 M =  16
DATASET  BS2.  TREE =  031   SITE INDEX =  11.79    AGE 1.3 M =  11
DATASET  BS2.  TREE =  059   SITE INDEX =   4.35    AGE 1.3 M =  33
DATASET  BS2.  TREE =  066   SITE INDEX =   8.45    AGE 1.3 M =  18
DATASET  BS2.  TREE =  096   SITE INDEX =   7.41    AGE 1.3 M =  16
DATASET  BS2.  TREE =  098   SITE INDEX =   8.17    AGE 1.3 M =  12
DATASET  BS2.  TREE =  099   SITE INDEX =   6.96    AGE 1.3 M =  17
DATASET  BS2.  TREE =  904   SITE INDEX =   8.70    AGE 1.3 M =  13
DATASET  BS2.  TREE =  905   SITE INDEX =  11.40    AGE 1.3 M =  14
DATASET  BS2.  TREE =  907   SITE INDEX =   8.68    AGE 1.3 M =   9
DATASET  BS2.  TREE =  908   SITE INDEX =   7.07    AGE 1.3 M =  13
DATASET  BS2.  TREE =  922   SITE INDEX =  11.27    AGE 1.3 M =   9
DATASET  BS2.  TREE =  927   SITE INDEX =   8.91    AGE 1.3 M =  10
DATASET  BS2.  TREE =  928   SITE INDEX =   9.32    AGE 1.3 M =  13
DATASET  BS2.  TREE =  929   SITE INDEX =   6.72    AGE 1.3 M =  12
DATASET  BS2.  TREE =  936   SITE INDEX =   9.07    AGE 1.3 M =  15

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS4.DAT

DATASET  BS4.  TREE =  189   SITE INDEX =   4.90     AGE 1.3 M =  39
DATASET  BS4.  TREE =  190   SITE INDEX =   4.70     AGE 1.3 M =  19
DATASET  BS4.  TREE =  191   SITE INDEX =   3.58     AGE 1.3 M =  30
DATASET  BS4.  TREE =  192   SITE INDEX =   5.02     AGE 1.3 M =  18
DATASET  BS4.  TREE =  193   SITE INDEX =   5.39     AGE 1.3 M =  31
DATASET  BS4.  TREE =  198   SITE INDEX =   4.78     AGE 1.3 M =  22
DATASET  BS4.  TREE =  229   SITE INDEX =   5.33     AGE 1.3 M =  29
DATASET  BS4.  TREE =  233   SITE INDEX =   6.81     AGE 1.3 M =  16
DATASET  BS4.  TREE =  234   SITE INDEX =   5.68     AGE 1.3 M =  19
DATASET  BS4.  TREE =  236   SITE INDEX =   5.58     AGE 1.3 M =  38
DATASET  BS4.  TREE =  237   SITE INDEX =   6.78     AGE 1.3 M =  30
DATASET  BS4.  TREE =  238   SITE INDEX =   5.09     AGE 1.3 M =  20
DATASET  BS4.  TREE =  240   SITE INDEX =   6.14     AGE 1.3 M =  25

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS5.DAT

DATASET  BS5.  TREE =  317   SITE INDEX =   9.09     AGE 1.3 M =  15
DATASET  BS5.  TREE =  319   SITE INDEX =  10.06     AGE 1.3 M =  11
DATASET  BS5.  TREE =  323   SITE INDEX =   8.92     AGE 1.3 M =  13
DATASET  BS5.  TREE =  324   SITE INDEX =   8.80     AGE 1.3 M =  11
DATASET  BS5.  TREE =  326   SITE INDEX =   6.96     AGE 1.3 M =  15
DATASET  BS5.  TREE =  327   SITE INDEX =   6.07     AGE 1.3 M =  11
DATASET  BS5.  TREE =  328   SITE INDEX =   7.68     AGE 1.3 M =  10
DATASET  BS5.  TREE =  329   SITE INDEX =   6.56     AGE 1.3 M =  27
DATASET  BS5.  TREE =  330   SITE INDEX =   6.83     AGE 1.3 M =  15
DATASET  BS5.  TREE =  347   SITE INDEX =   8.55     AGE 1.3 M =  25
DATASET  BS5.  TREE =  348   SITE INDEX =  10.14     AGE 1.3 M =  12
DATASET  BS5.  TREE =  352   SITE INDEX =   7.22     AGE 1.3 M =  18
DATASET  BS5.  TREE =  353   SITE INDEX =   6.81     AGE 1.3 M =  19
DATASET  BS5.  TREE =  358   SITE INDEX =   5.00     AGE 1.3 M =  11
DATASET  BS5.  TREE =  359   SITE INDEX =   8.89     AGE 1.3 M =  15
DATASET  BS5.  TREE =  360   SITE INDEX =   9.70     AGE 1.3 M =  15

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->BS8.DAT

DATASET  BS8.  TREE =  452   SITE INDEX =   2.03     AGE 1.3 M =  86
DATASET  BS8.  TREE =  479   SITE INDEX =   3.85     AGE 1.3 M =  11
DATASET  BS8.  TREE =  482   SITE INDEX =   6.41     AGE 1.3 M =  19
DATASET  BS8.  TREE =  481   SITE INDEX =   4.86     AGE 1.3 M =   9
DATASET  BS8.  TREE =  484   SITE INDEX =   3.18     AGE 1.3 M =  22
DATASET  BS8.  TREE =  486   SITE INDEX =   5.46     AGE 1.3 M =  15
DATASET  BS8.  TREE =  487   SITE INDEX =   6.74     AGE 1.3 M =  18
DATASET  BS8.  TREE =  488   SITE INDEX =   5.50     AGE 1.3 M =  17
DATASET  BS8.  TREE =  489   SITE INDEX =   4.83     AGE 1.3 M =  17
DATASET  BS8.  TREE =  496   SITE INDEX =   4.38     AGE 1.3 M =  24
DATASET  BS8.  TREE =  497   SITE INDEX =   5.20     AGE 1.3 M =  18
DATASET  BS8.  TREE =  498   SITE INDEX =   4.92     AGE 1.3 M =  14
DATASET  BS8.  TREE =  504   SITE INDEX =   3.98     AGE 1.3 M =  55
DATASET  BS8.  TREE =  505   SITE INDEX =   3.75     AGE 1.3 M =  32

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

   GIVE DATA FILE NAME [*.DAT] ->BS9.DAT

DATASET  BS9.  TREE =  514   SITE INDEX =   2.48     AGE 1.3 M =  71
DATASET  BS9.  TREE =  515   SITE INDEX =   3.34     AGE 1.3 M =  34
DATASET  BS9.  TREE =  517   SITE INDEX =   2.82     AGE 1.3 M =  27
DATASET  BS9.  TREE =  518   SITE INDEX =   6.61     AGE 1.3 M =  39
DATASET  BS9.  TREE =  520   SITE INDEX =   3.83     AGE 1.3 M =  26
DATASET  BS9.  TREE =  522   SITE INDEX =   3.03     AGE 1.3 M =  47
DATASET  BS9.  TREE =  534   SITE INDEX =   3.24     AGE 1.3 M =  50
DATASET  BS9.  TREE =  537   SITE INDEX =   4.47     AGE 1.3 M =  13
DATASET  BS9.  TREE =  538   SITE INDEX =   3.28     AGE 1.3 M =  27
DATASET  BS9.  TREE =  539   SITE INDEX =   7.46     AGE 1.3 M =  34
DATASET  BS9.  TREE =  549   SITE INDEX =   8.61     AGE 1.3 M =  13
DATASET  BS9.  TREE =  551   SITE INDEX =   8.44     AGE 1.3 M =  23
DATASET  BS9.  TREE =  552   SITE INDEX =   8.50     AGE 1.3 M =  17
DATASET  BS9.  TREE =  553   SITE INDEX =   6.50     AGE 1.3 M =  21
DATASET  BS9.  TREE =  555   SITE INDEX =   6.96     AGE 1.3 M =  20
DATASET  BS9.  TREE =  556   SITE INDEX =   5.35     AGE 1.3 M =  18
DATASET  BS9.  TREE =  557   SITE INDEX =   5.79     AGE 1.3 M =  20
DATASET  BS9.  TREE =  558   SITE INDEX =   6.35     AGE 1.3 M =  19
DATASET  BS9.  TREE =  559   SITE INDEX =   7.07     AGE 1.3 M =  16
DATASET  BS9.  TREE =  561   SITE INDEX =  11.87     AGE 1.3 M =   8
DATASET  BS9.  TREE =  562   SITE INDEX =  11.16     AGE 1.3 M =   5
DATASET  BS9.  TREE =  563   SITE INDEX =  10.51     AGE 1.3 M =   7
DATASET  BS9.  TREE =  564   SITE INDEX =  10.48     AGE 1.3 M =   7
DATASET  BS9.  TREE =  566   SITE INDEX =  10.40     AGE 1.3 M =   5
DATASET  BS9.  TREE =  567   SITE INDEX =  10.82     AGE 1.3 M =  10
DATASET  BS9.  TREE =  570   SITE INDEX =  12.79     AGE 1.3 M =   9
DATASET  BS9.  TREE =  574   SITE INDEX =  10.42     AGE 1.3 M =   9
DATASET  BS9.  TREE =  575   SITE INDEX =  12.05     AGE 1.3 M =   7
DATASET  BS9.  TREE =  576   SITE INDEX =  10.83     AGE 1.3 M =   9
DATASET  BS9.  TREE =  577   SITE INDEX =  11.66     AGE 1.3 M =   5
DATASET  BS9.  TREE =  581   SITE INDEX =   7.67     AGE 1.3 M =   8

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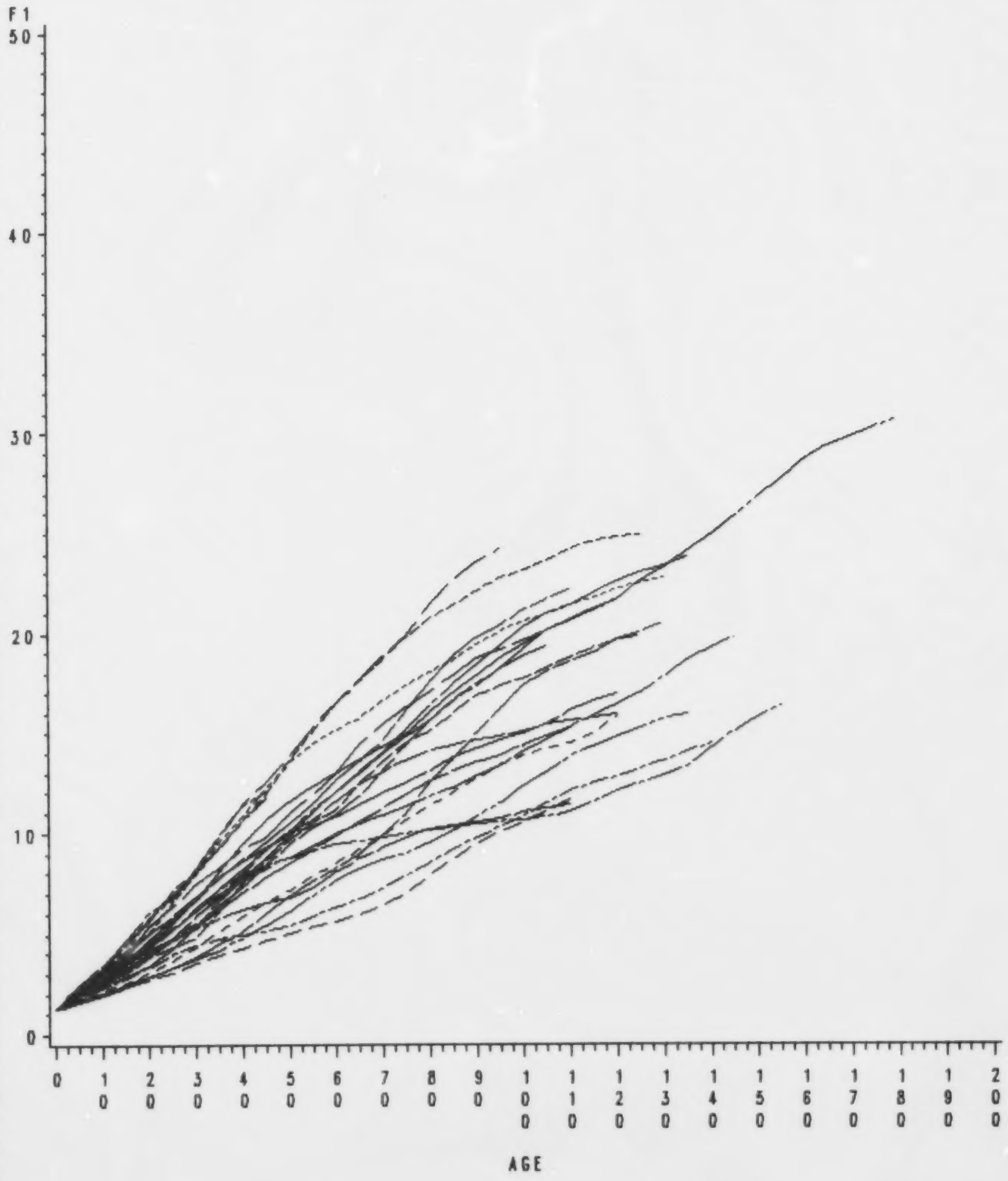
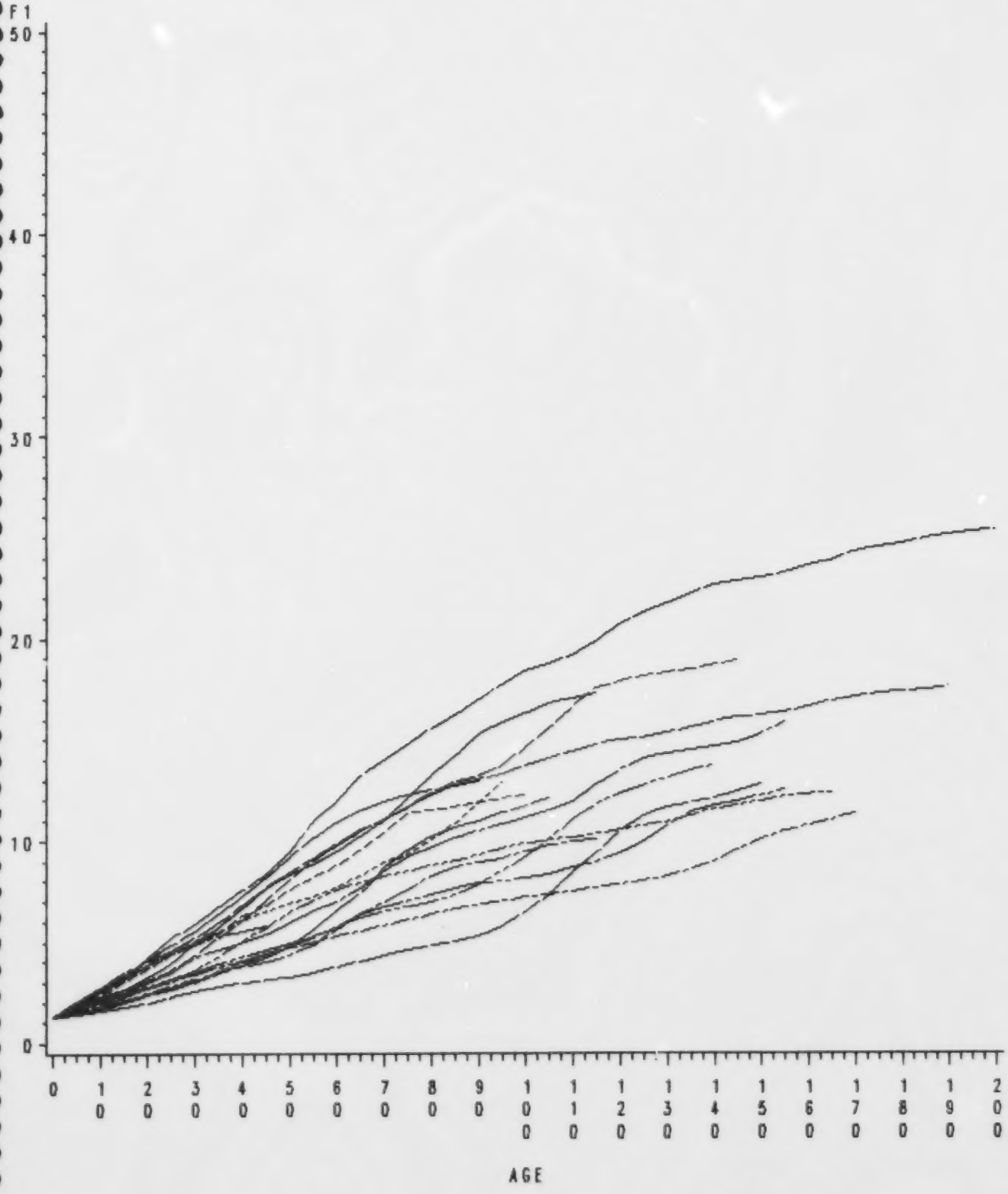
APPENDIX VI

White Spruce Data Plots and Statistics

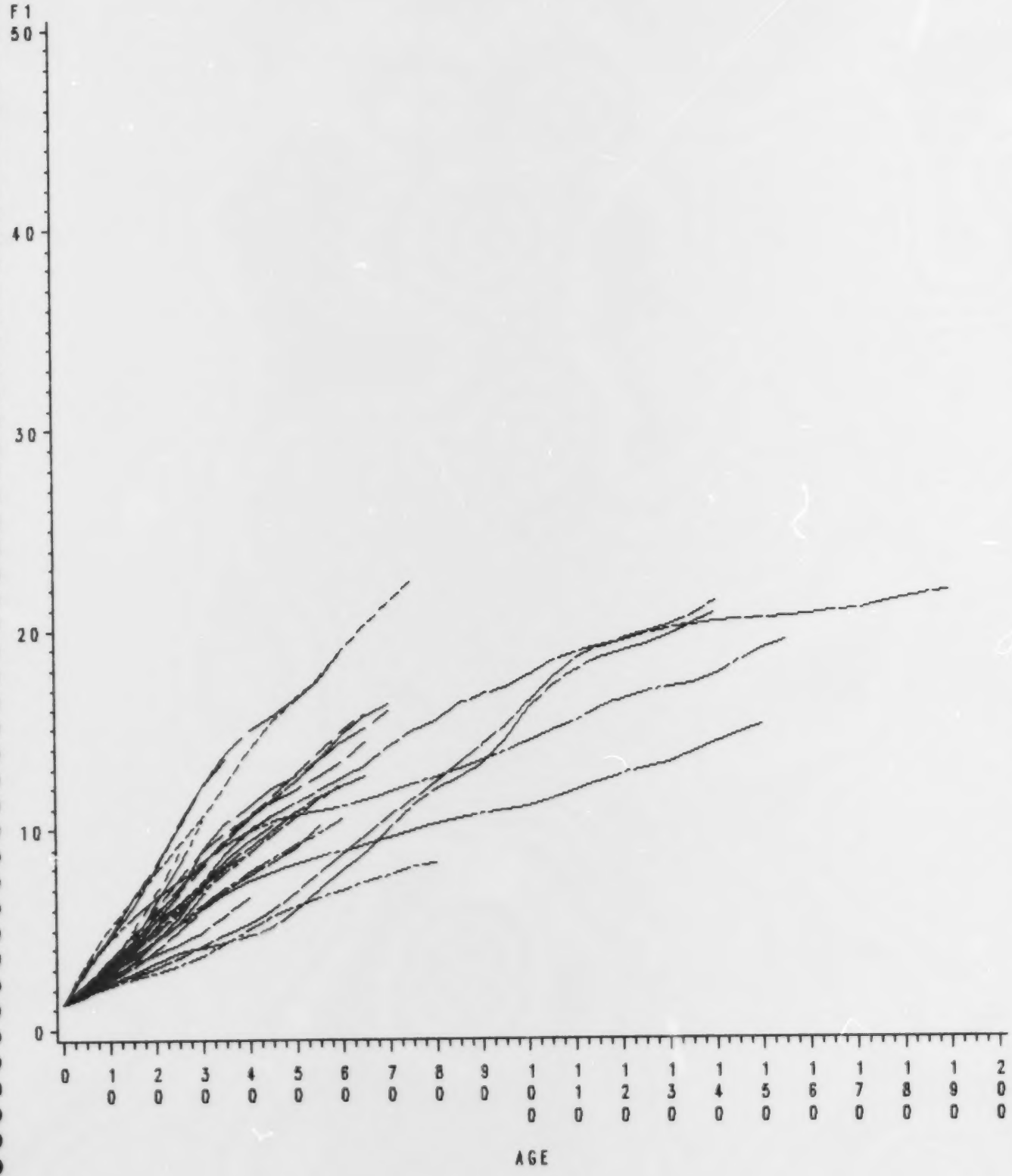
HEIGHT OVER AGE – DATA SET WS2



HEIGHT OVER AGE – DATA SET WS4

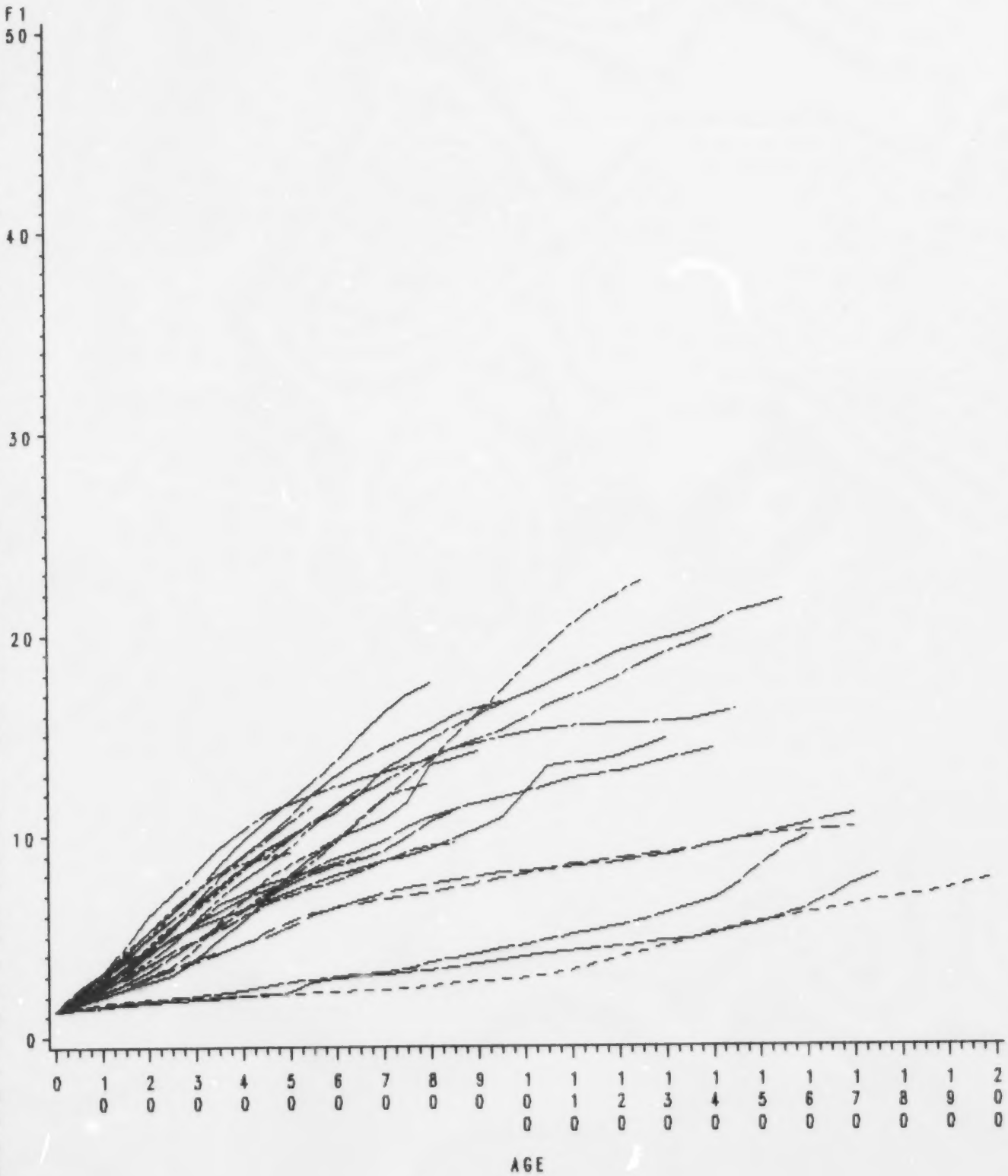


HEIGHT OVER AGE – DATA SET WS5



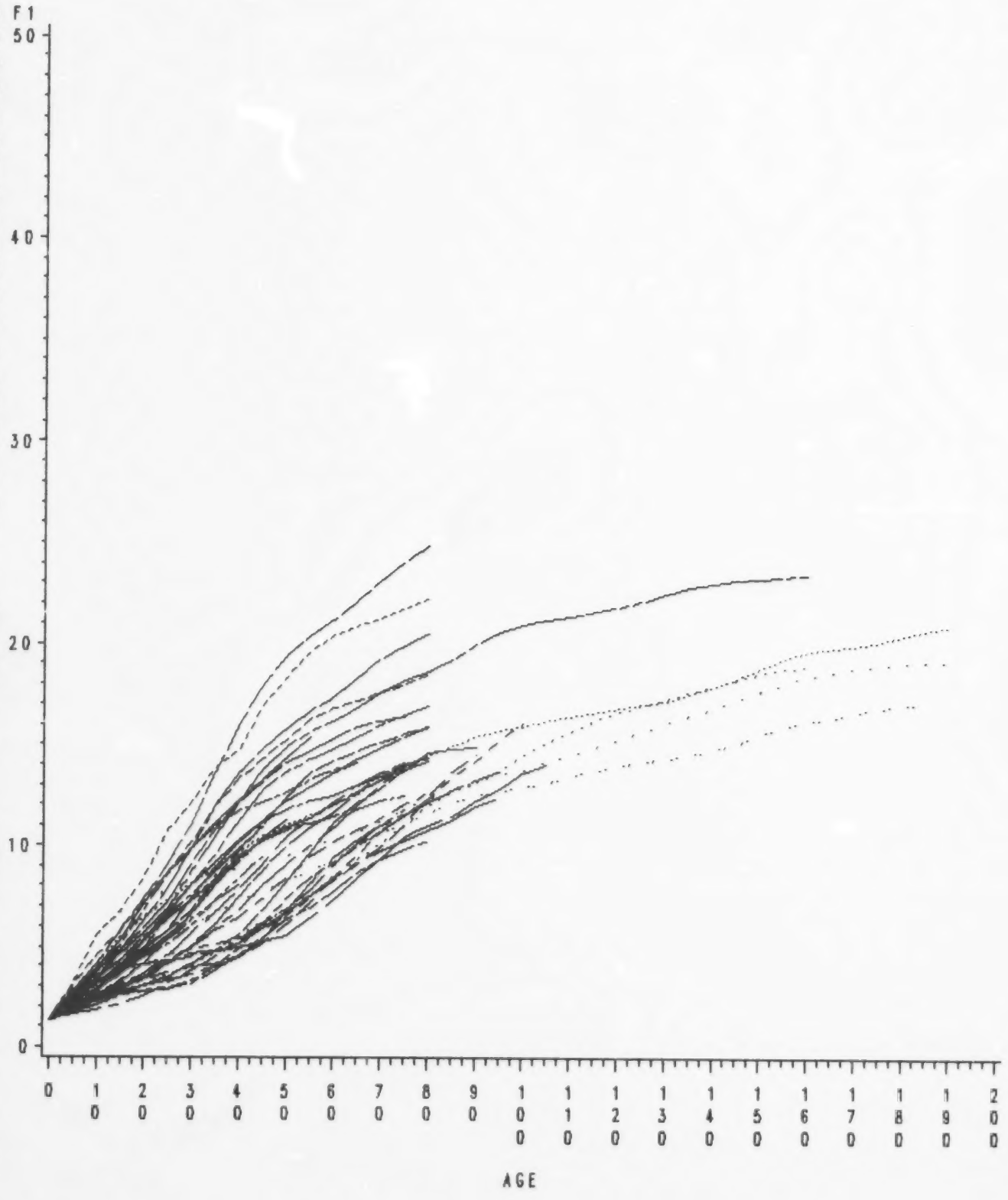
HEIGHT OVER AGE – DATA SET WS9

HEIGHT OVER AGE – DATA SET WS8

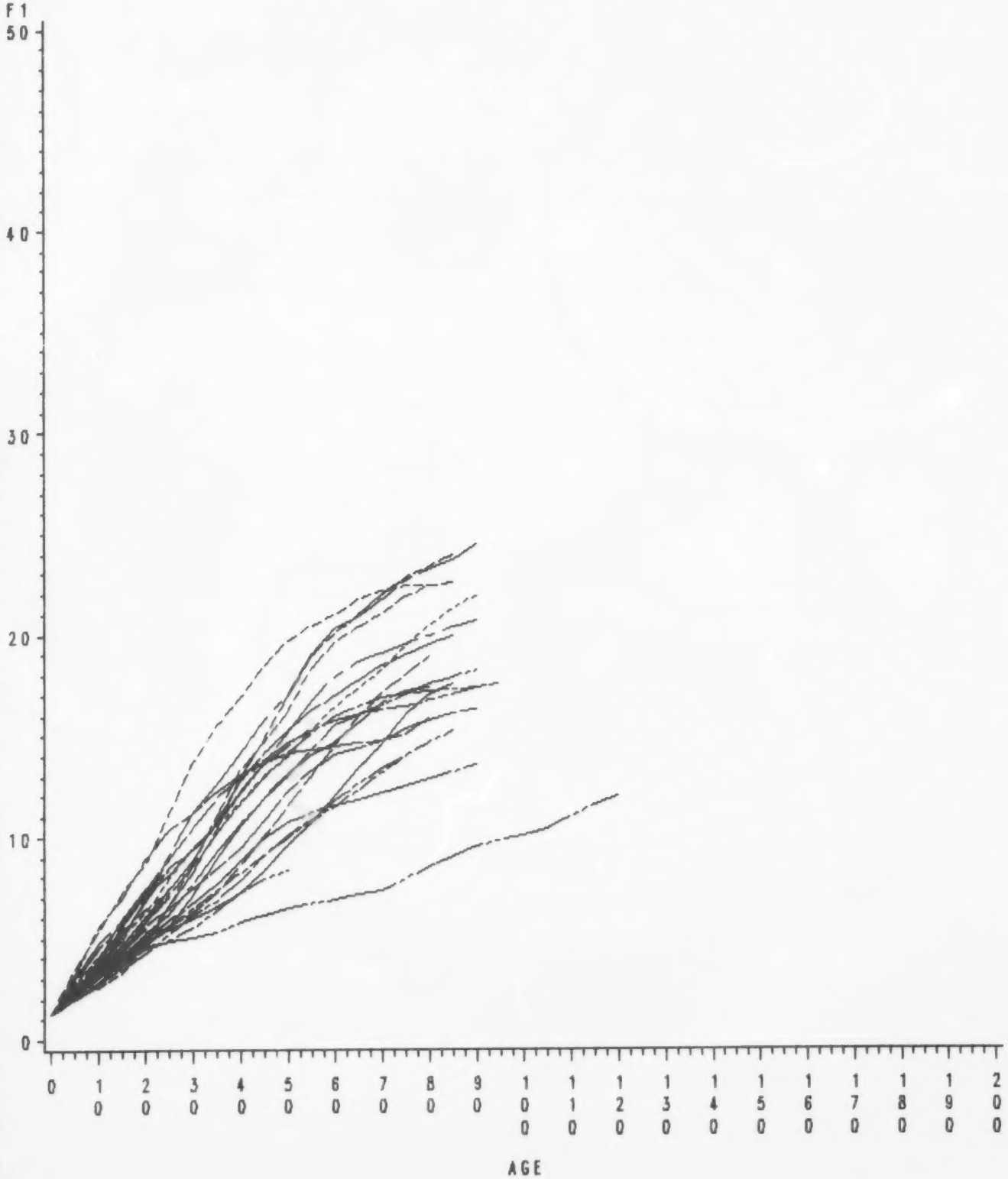


F1
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
AGE

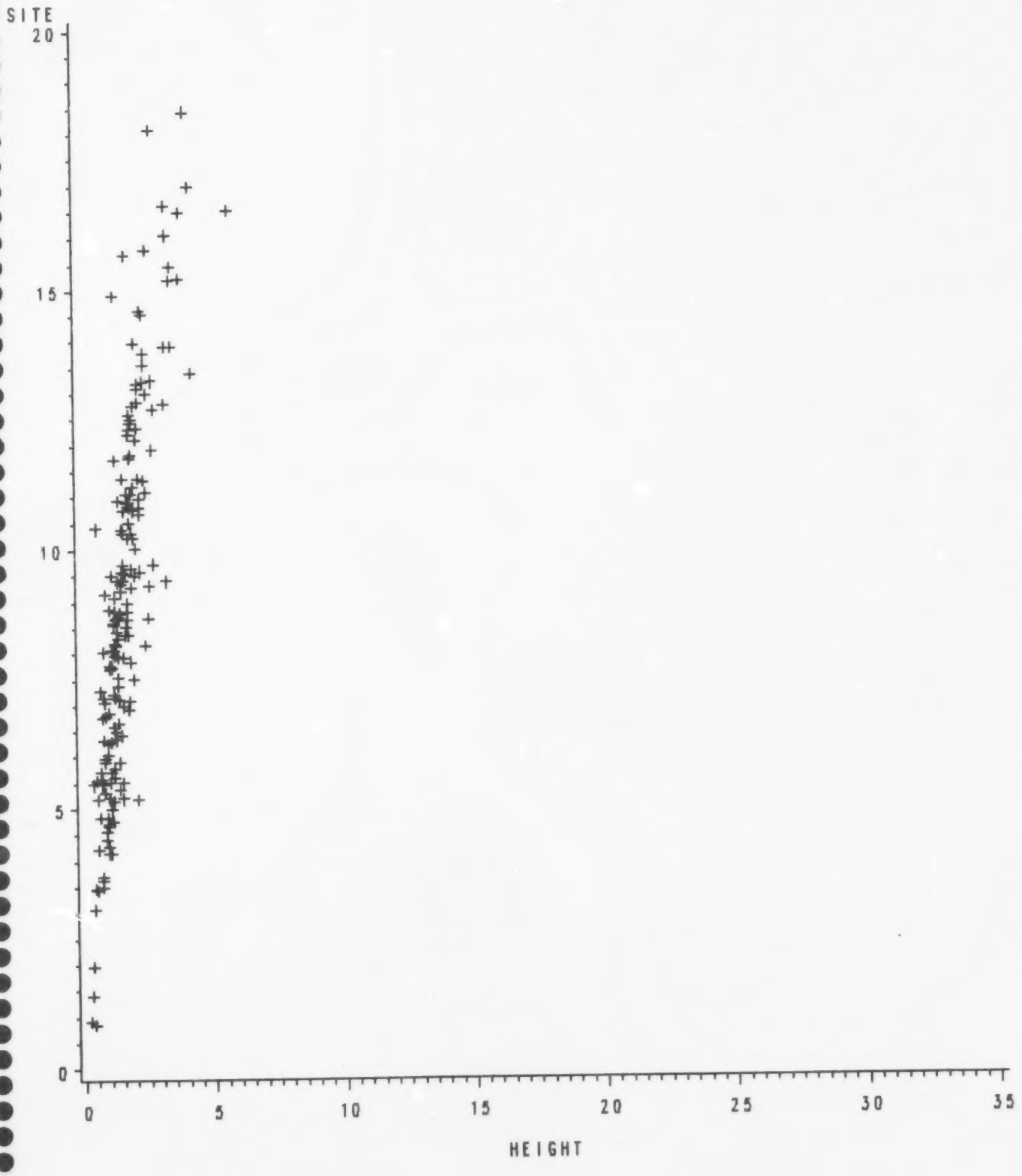
HEIGHT OVER AGE – DATA SET WS12



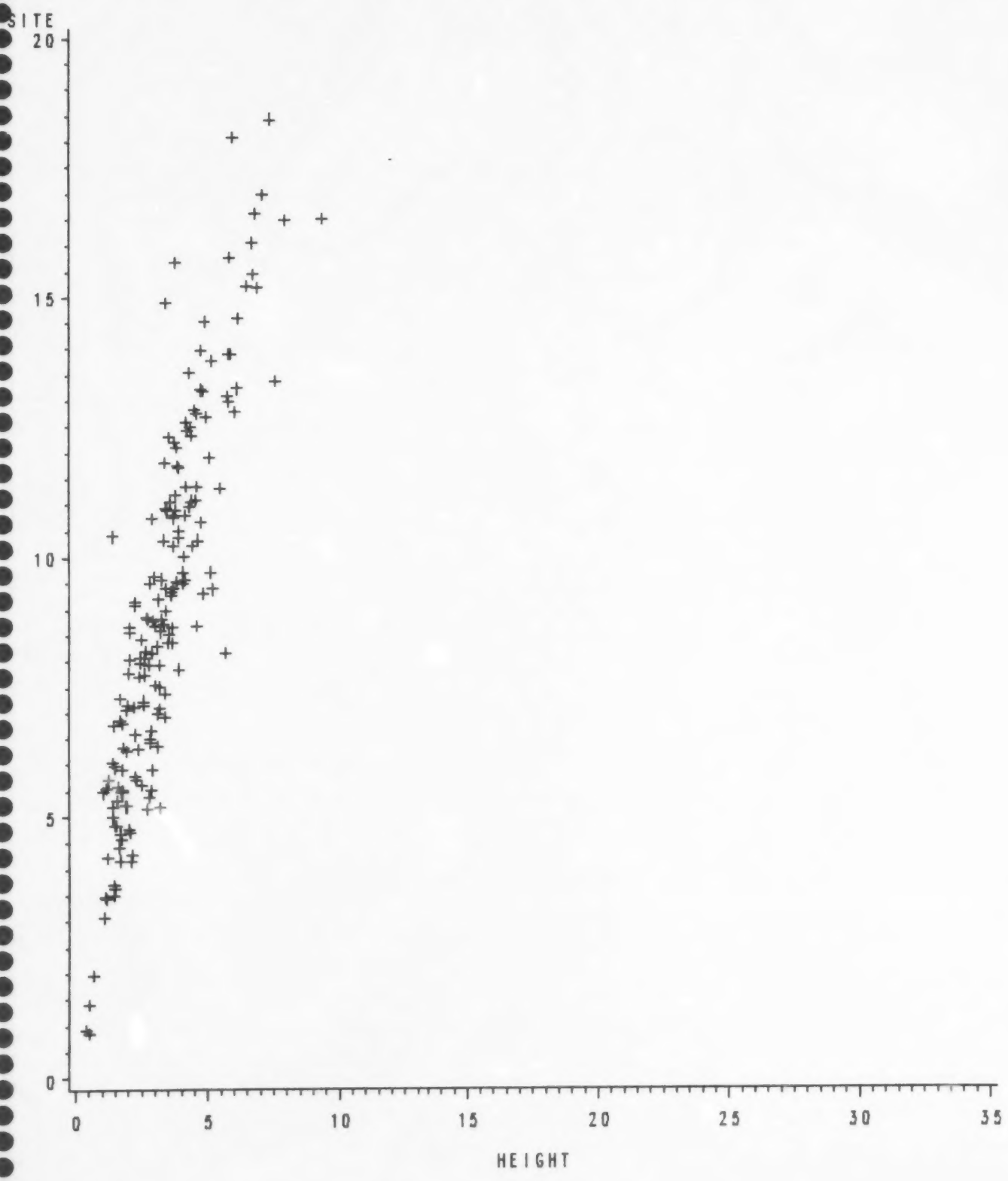
HEIGHT OVER AGE – DATA SET WS11



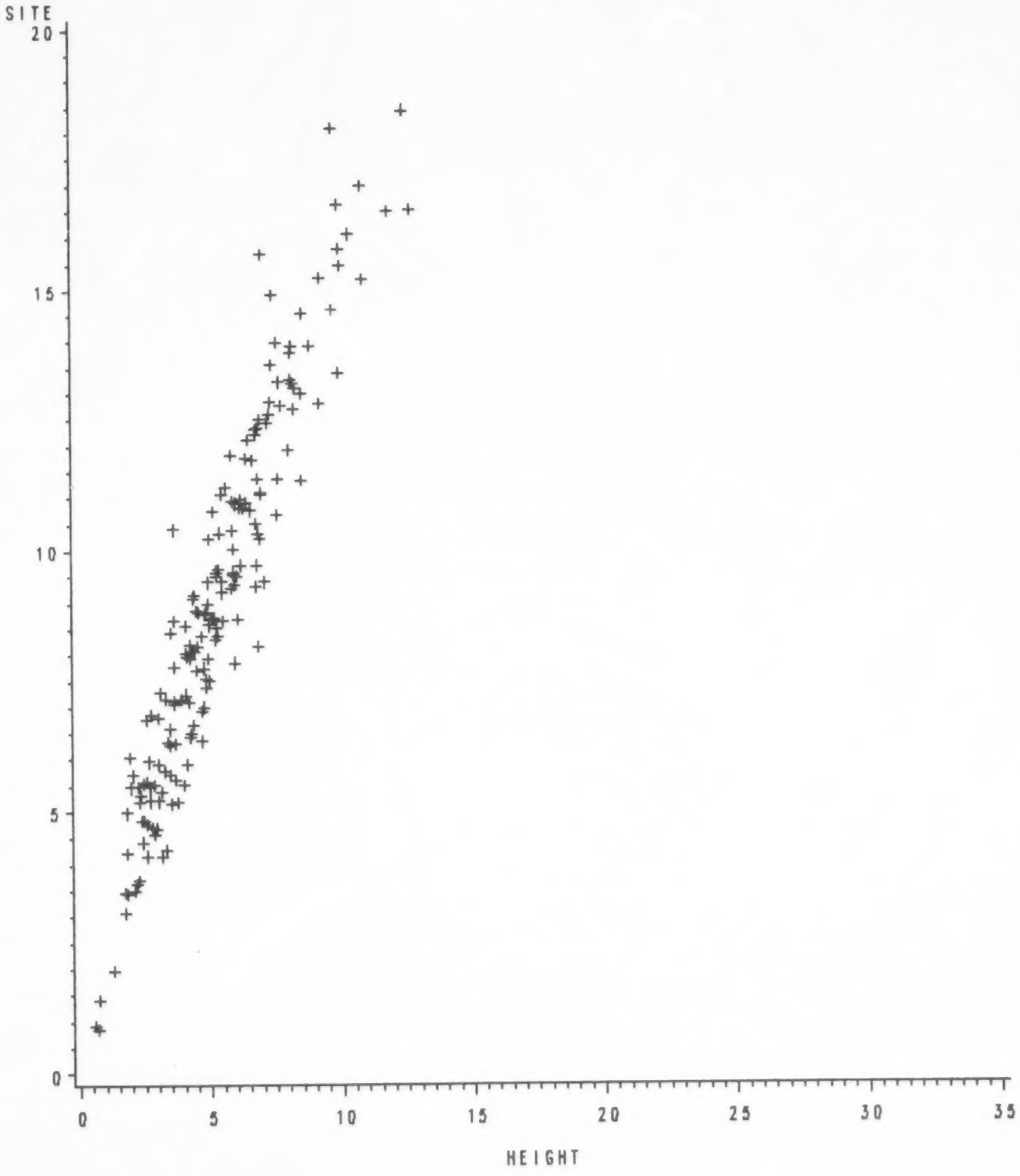
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 10 YRS



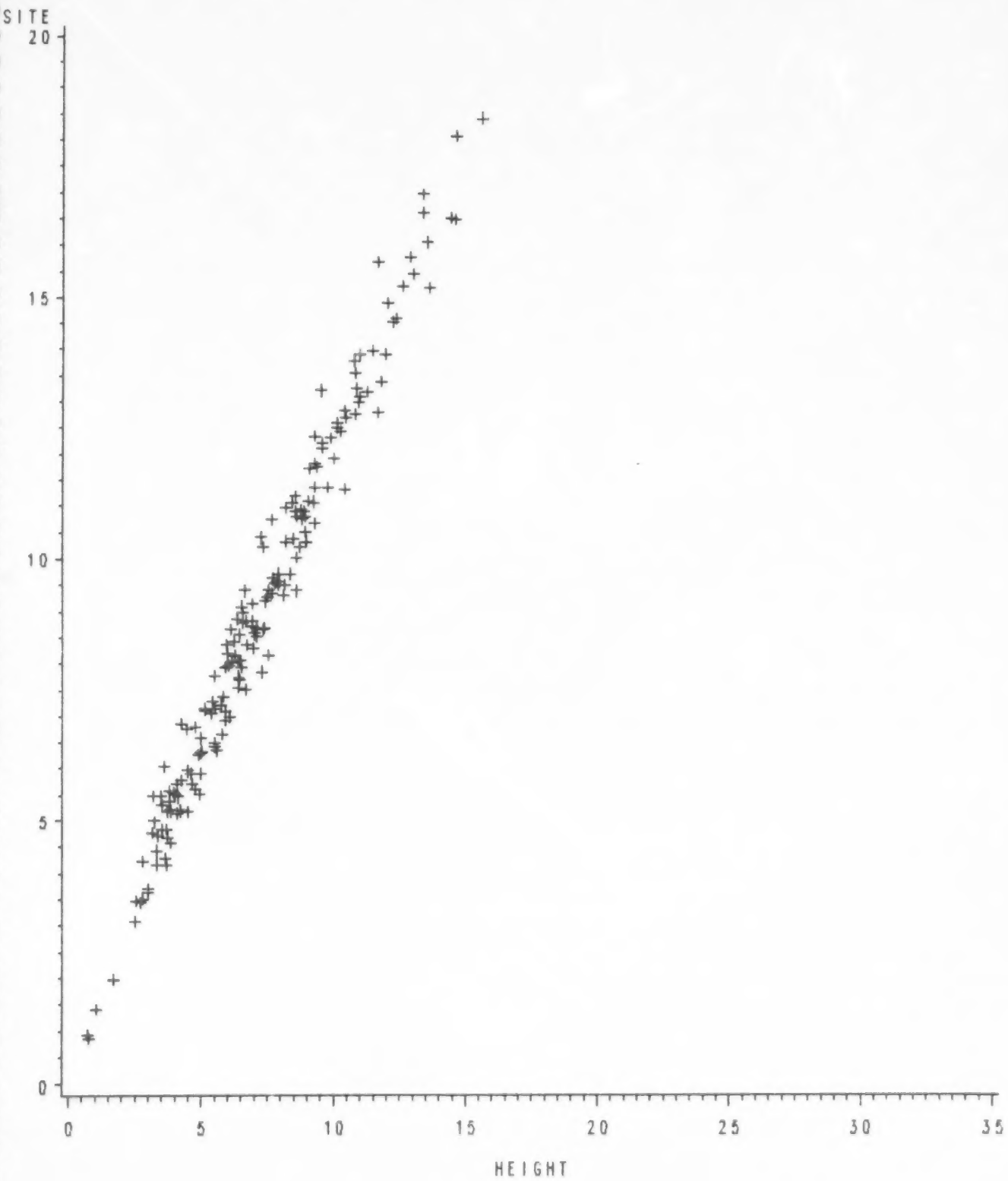
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 20 YRS



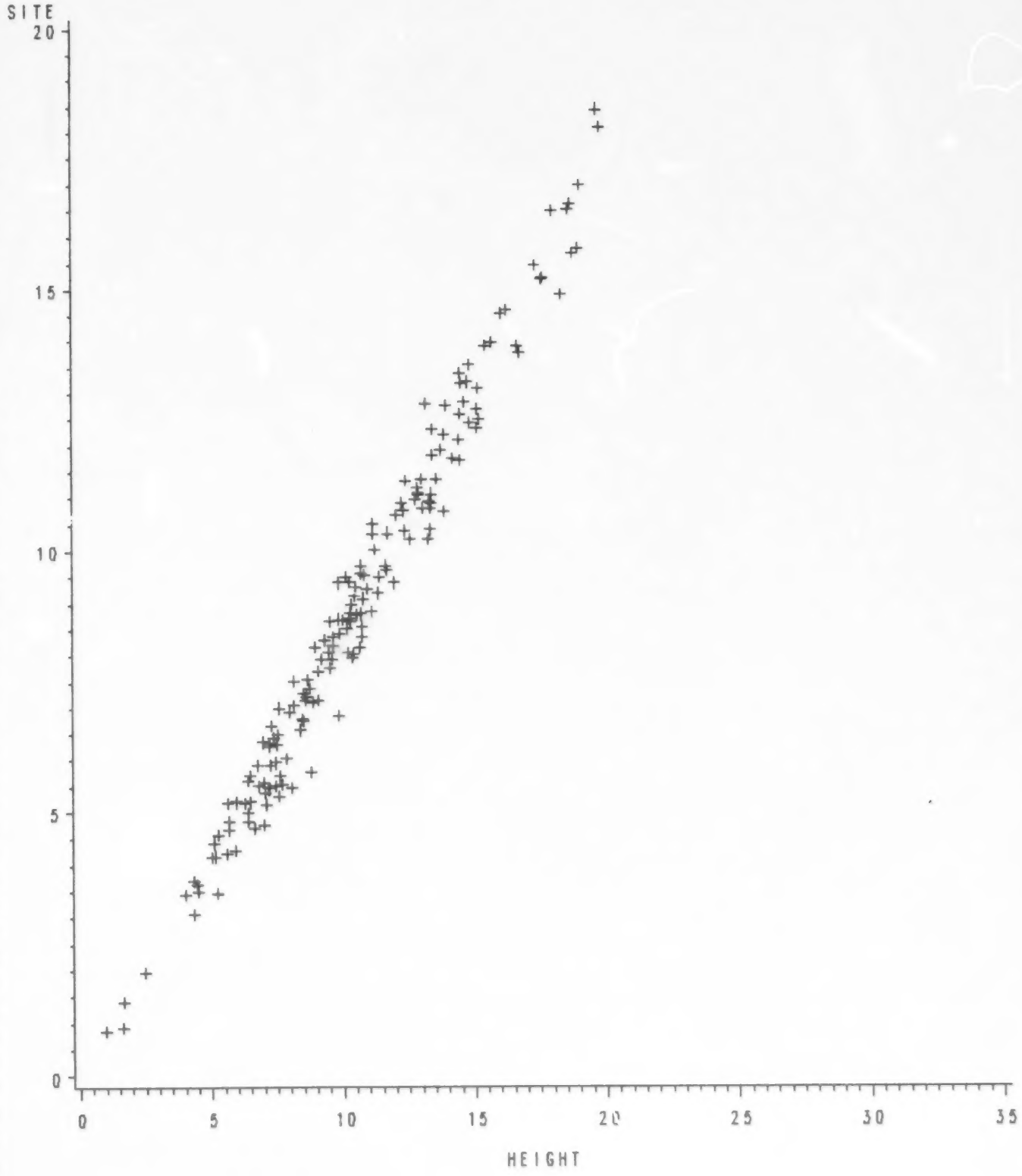
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 30 YRS



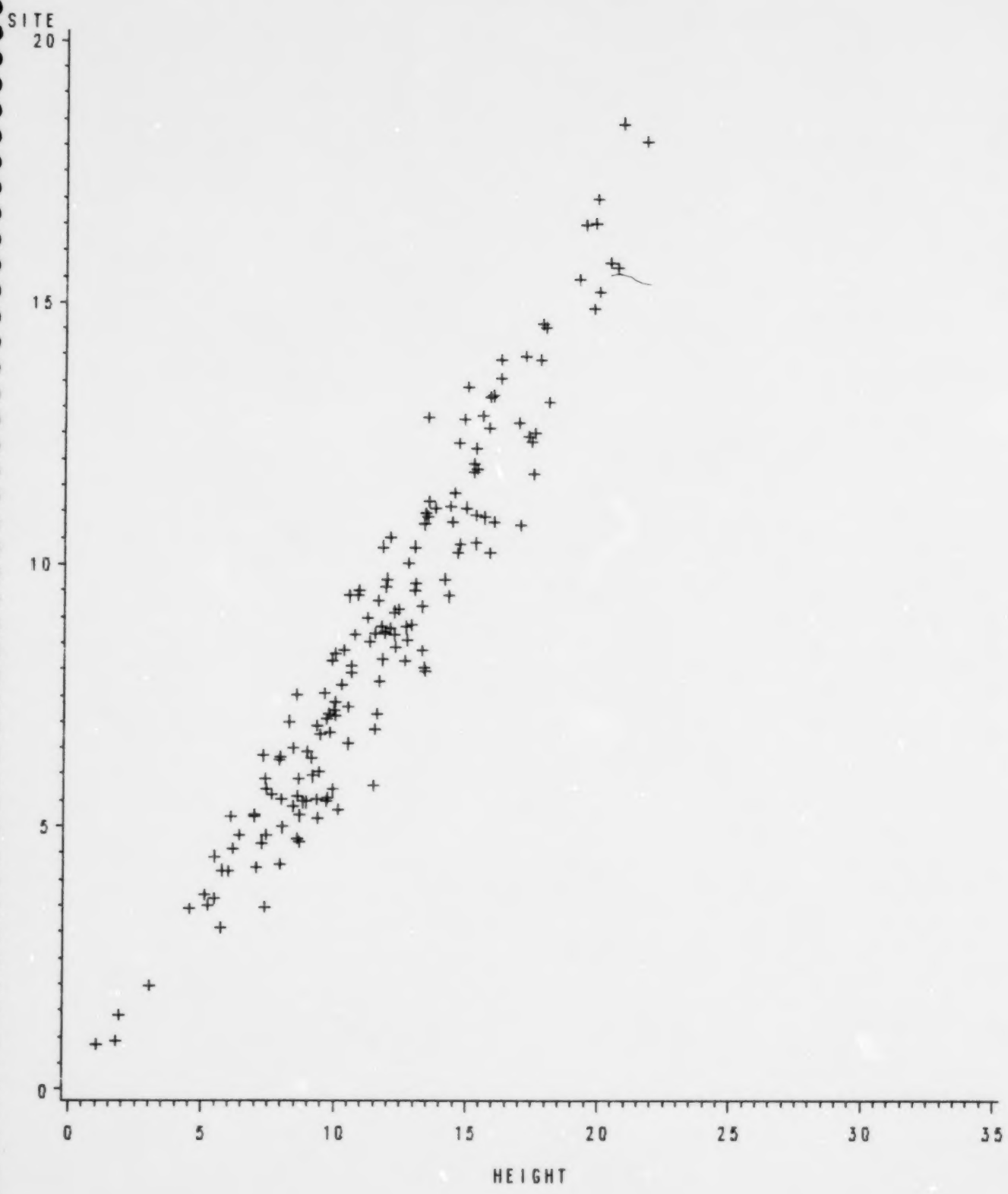
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 40 YRS



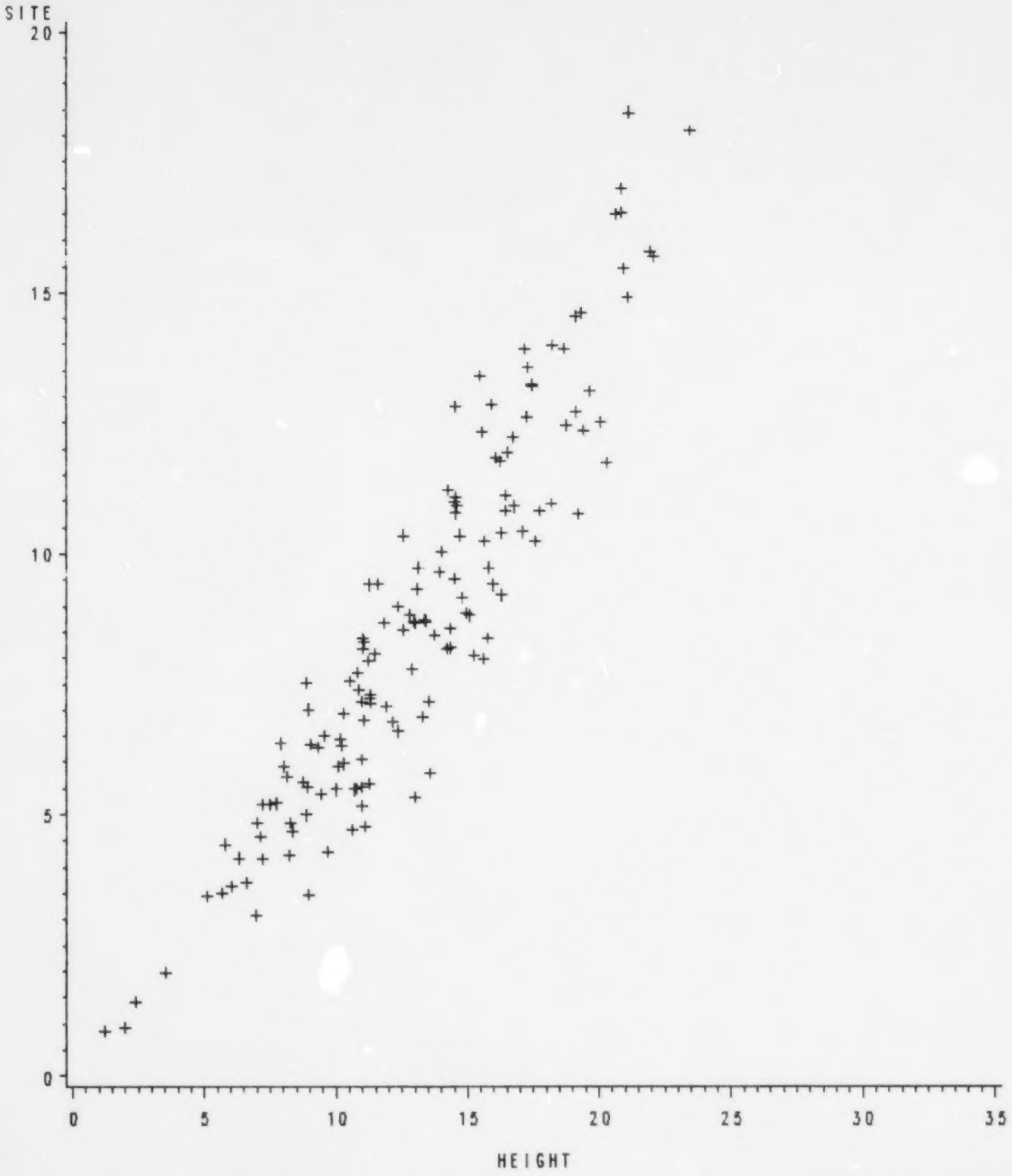
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 60 YRS



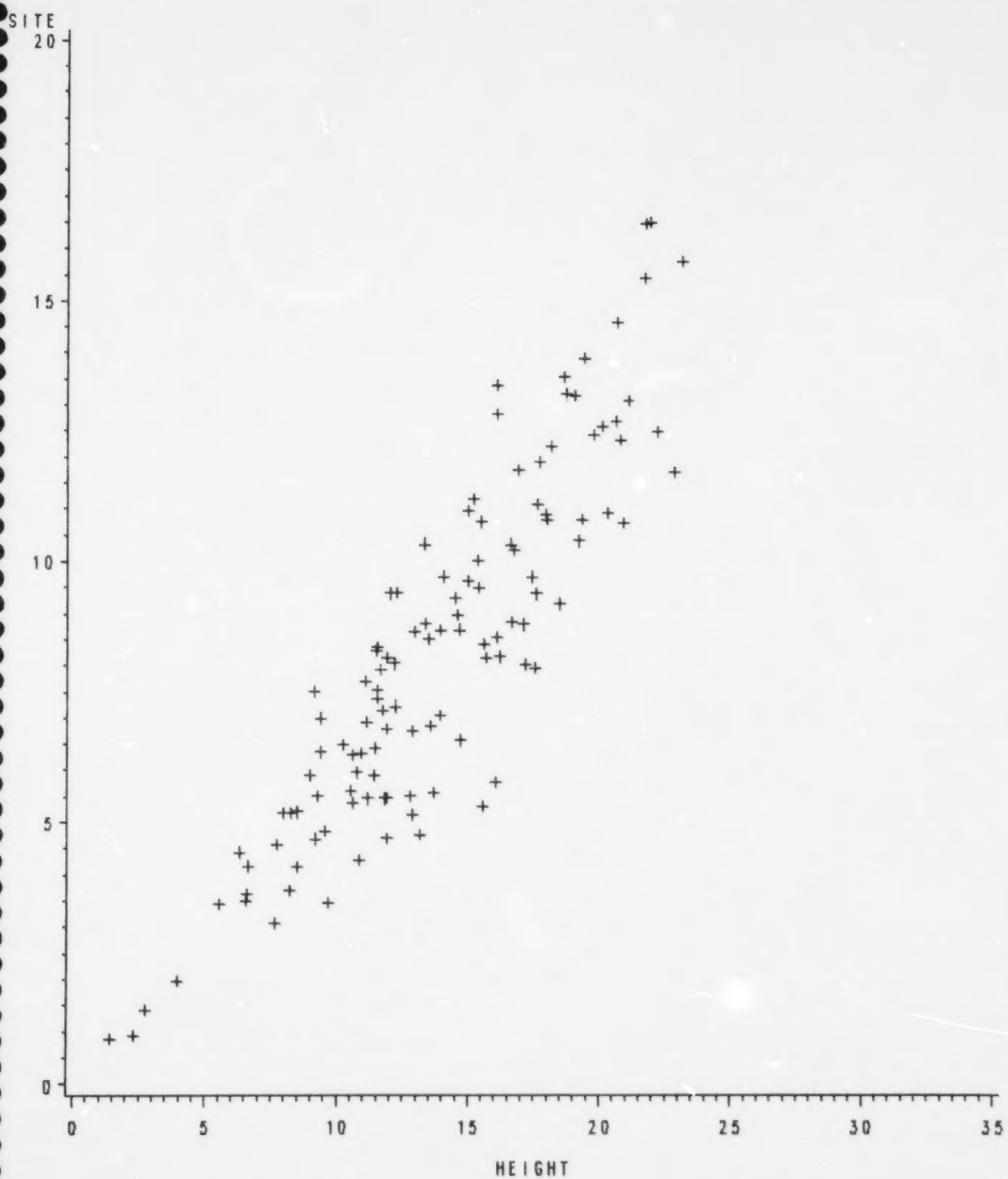
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 70 YRS



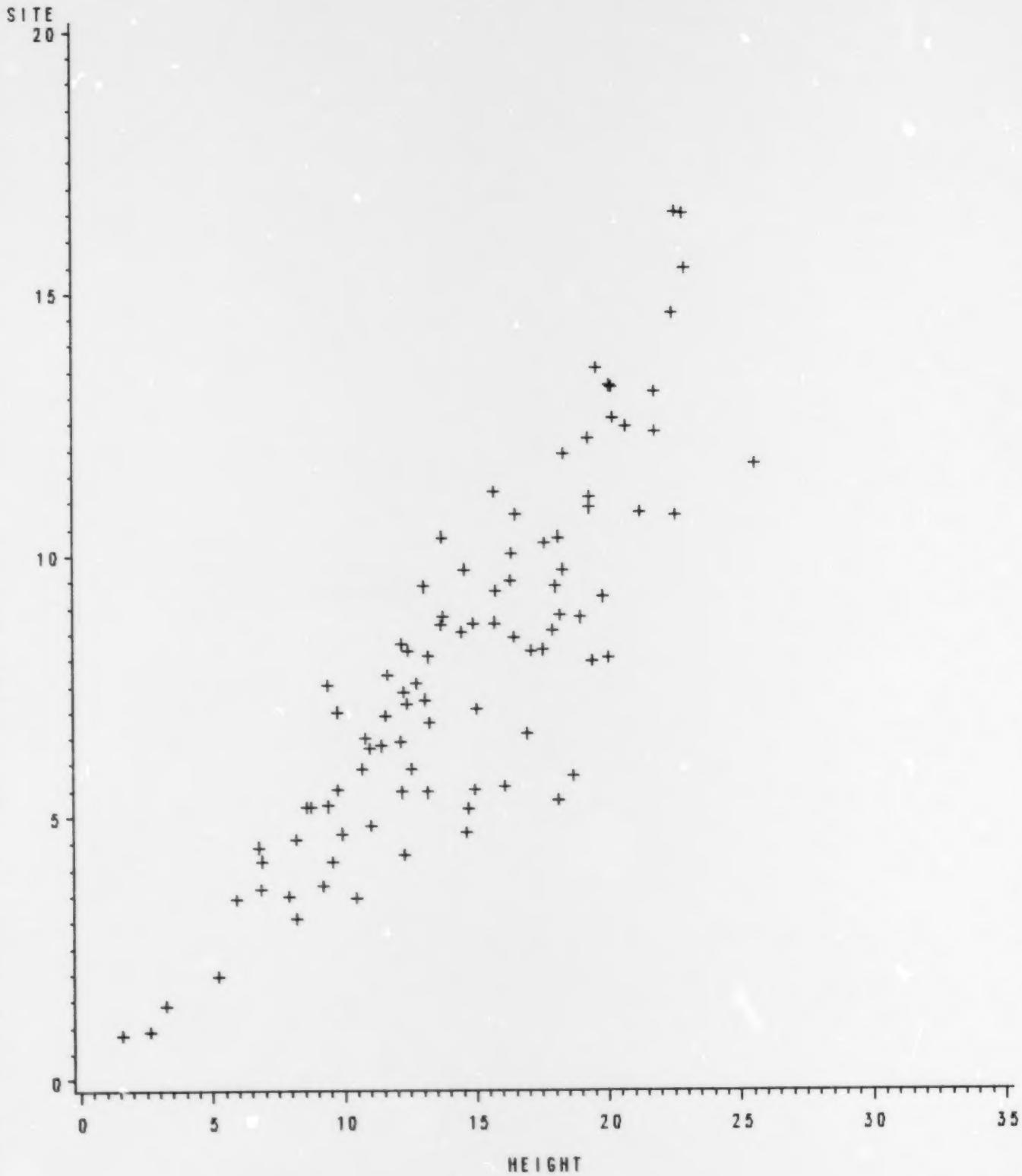
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 80 YRS



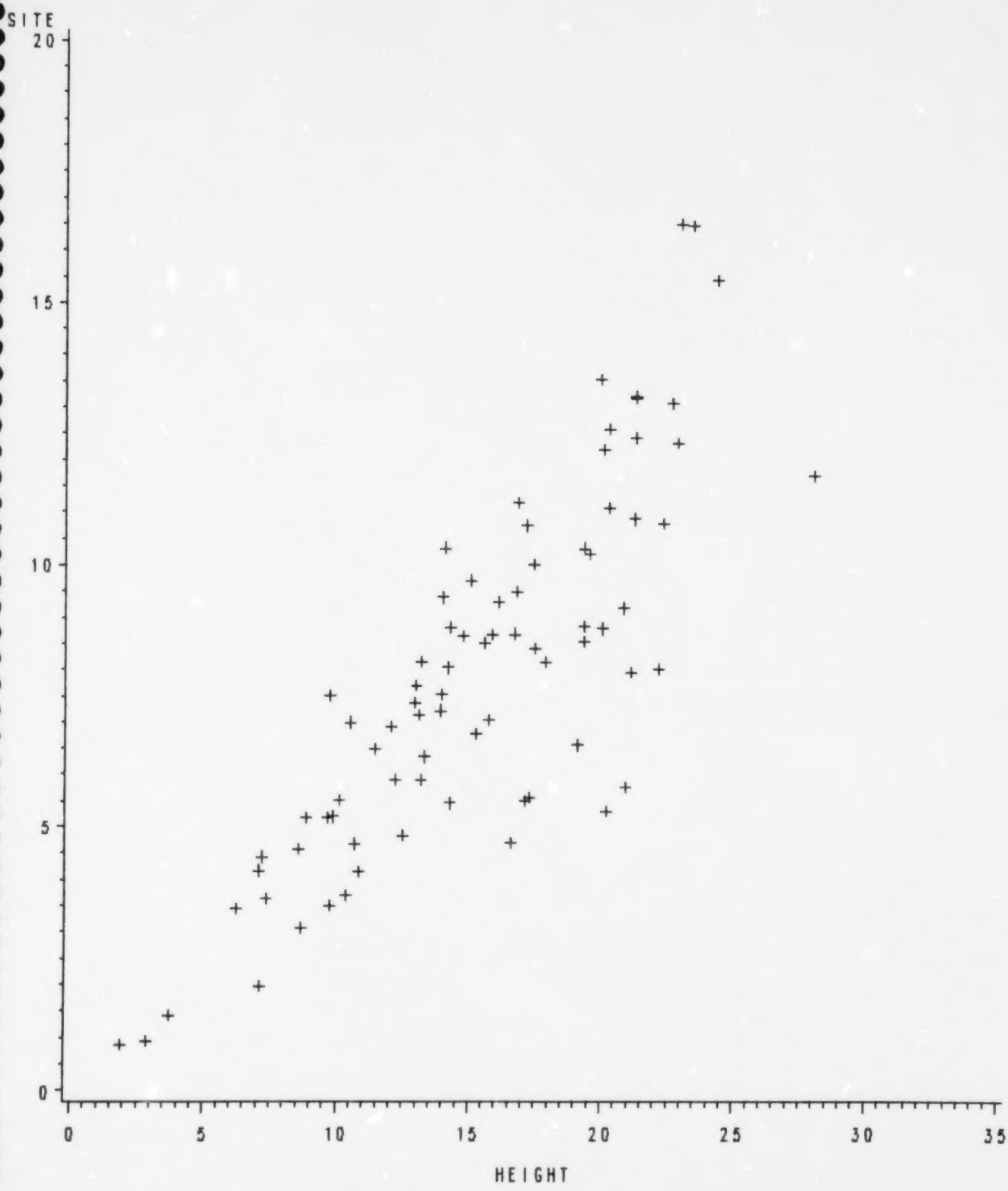
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 90 YRS



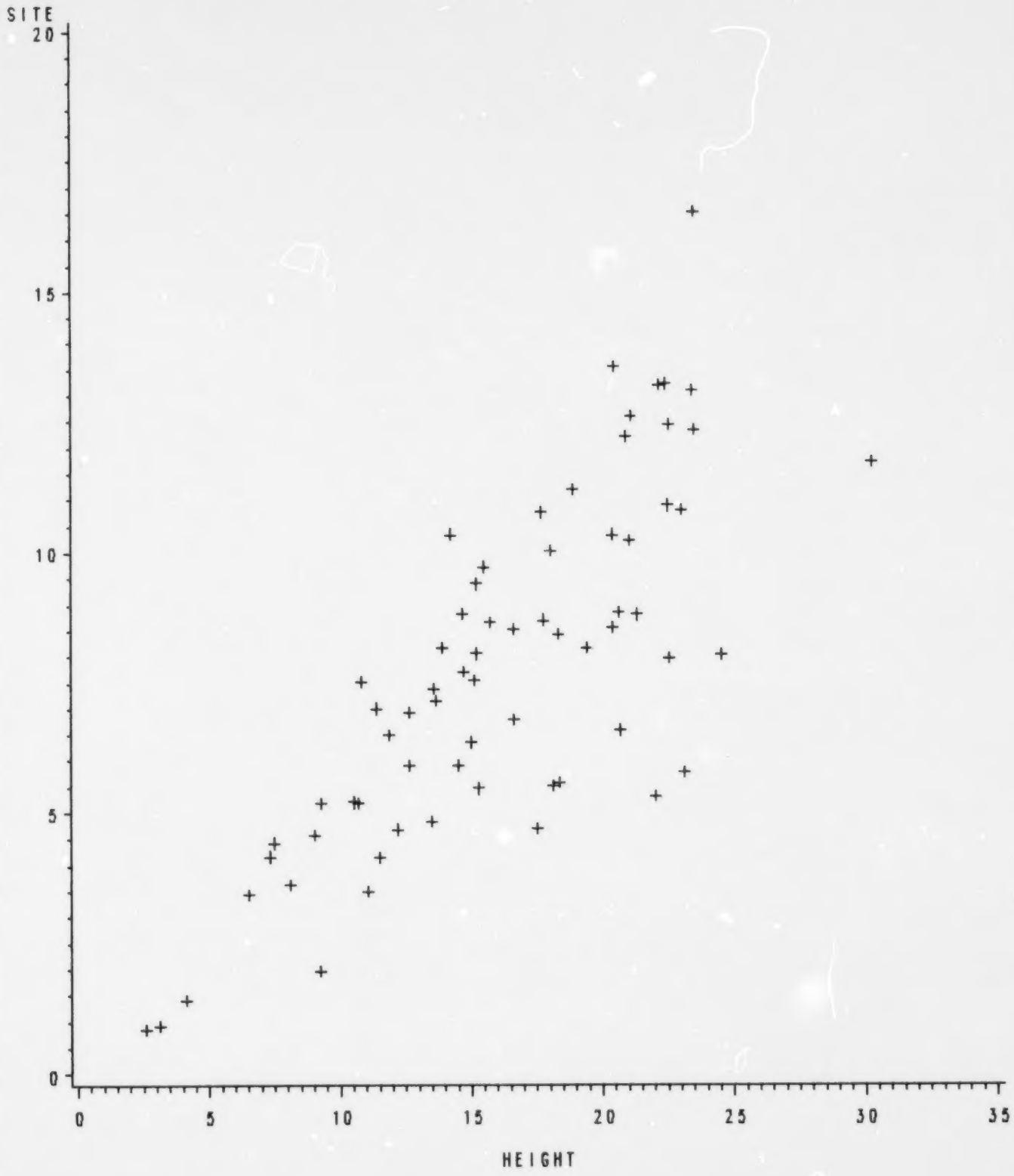
SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 100 YRS



SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 110 YRS

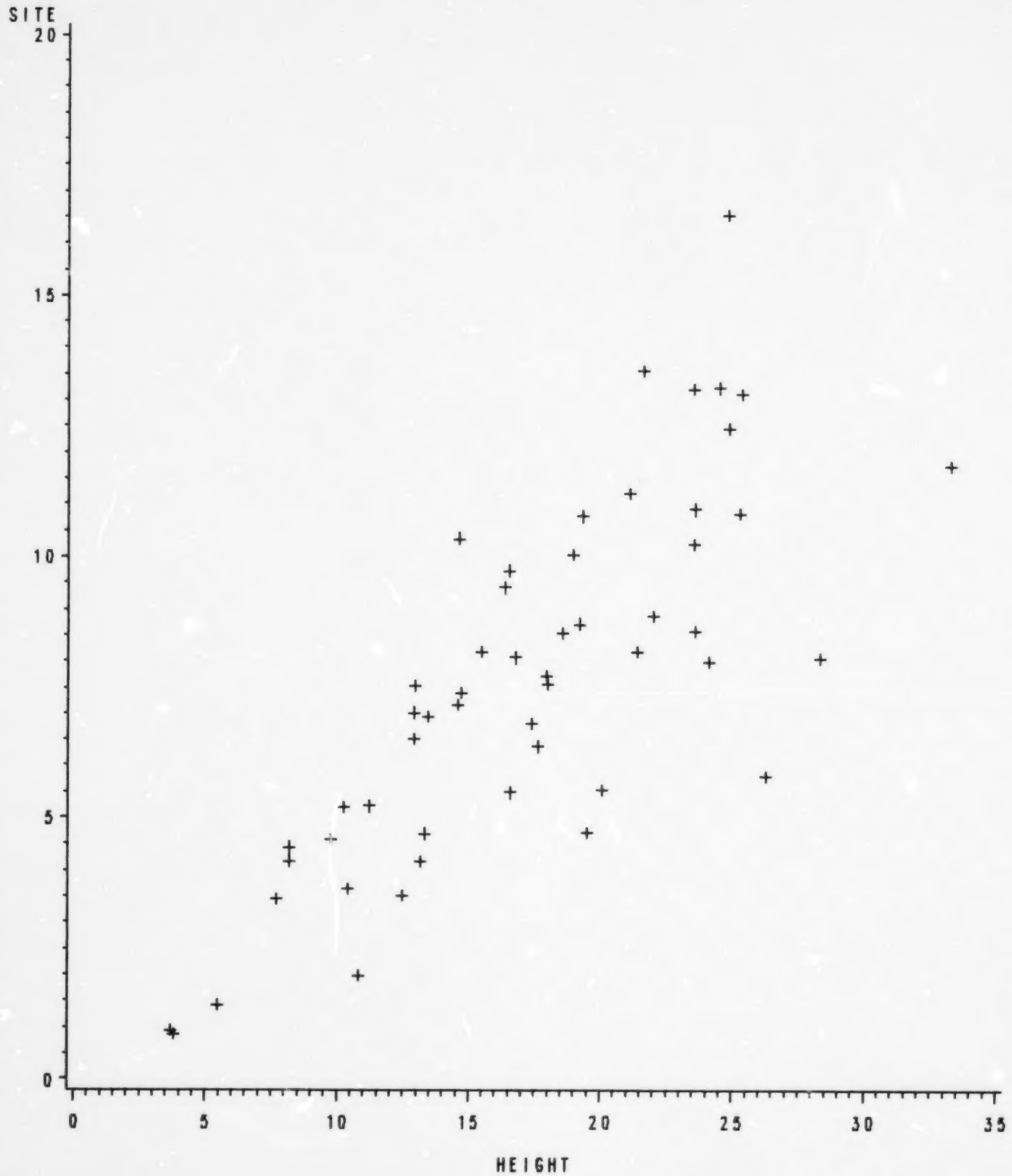


SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 120 YRS

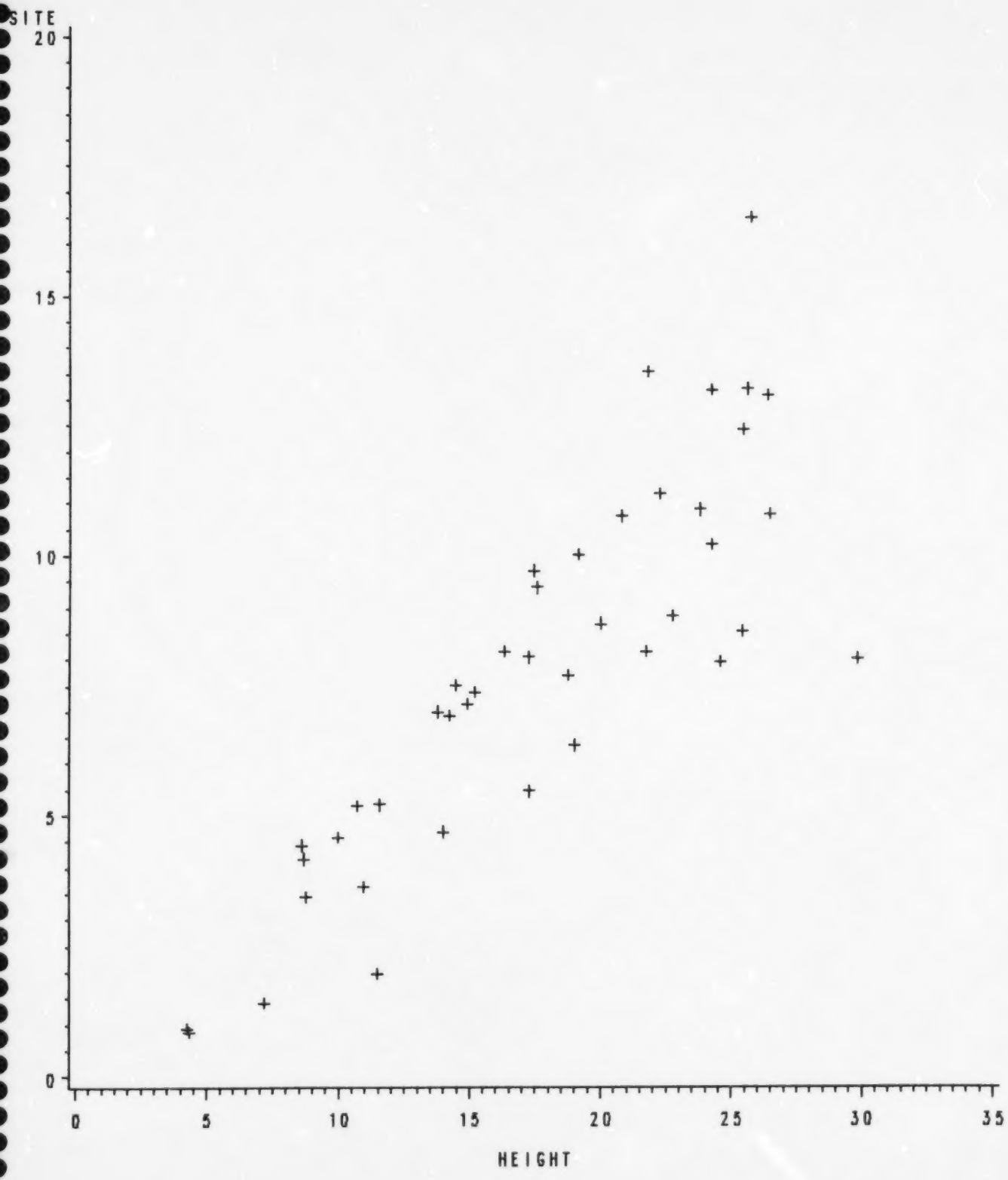


SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 130 YRS

SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 140 YRS



SITE INDEX – 1.3 m / HEIGHT – 1.3 m at 150 YRS



Model: MODEL1 - 10 YRS
Dependent Variable: SITE

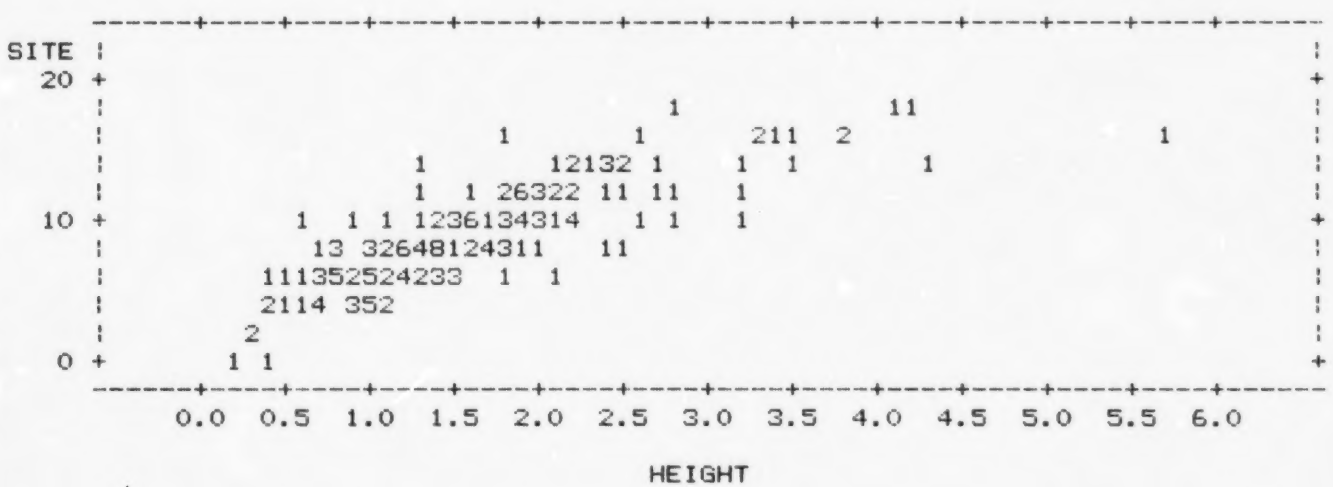
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	1537.57465	1537.57465	364.716	0.0001
Error	177	746.19999	4.21582		
C Total	178	2283.77464			

Root MSE	2.05325	R-square	0.6733
Dep Mean	8.96458	Adj R-sq	0.6714
C.V.	22.90398		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	3.341992	0.33201200	10.066	0.0001
HEIGHT	1	3.396246	0.17783693	19.098	0.0001



Model: MODEL1 - 20 YRS
Dependent Variable: SITE

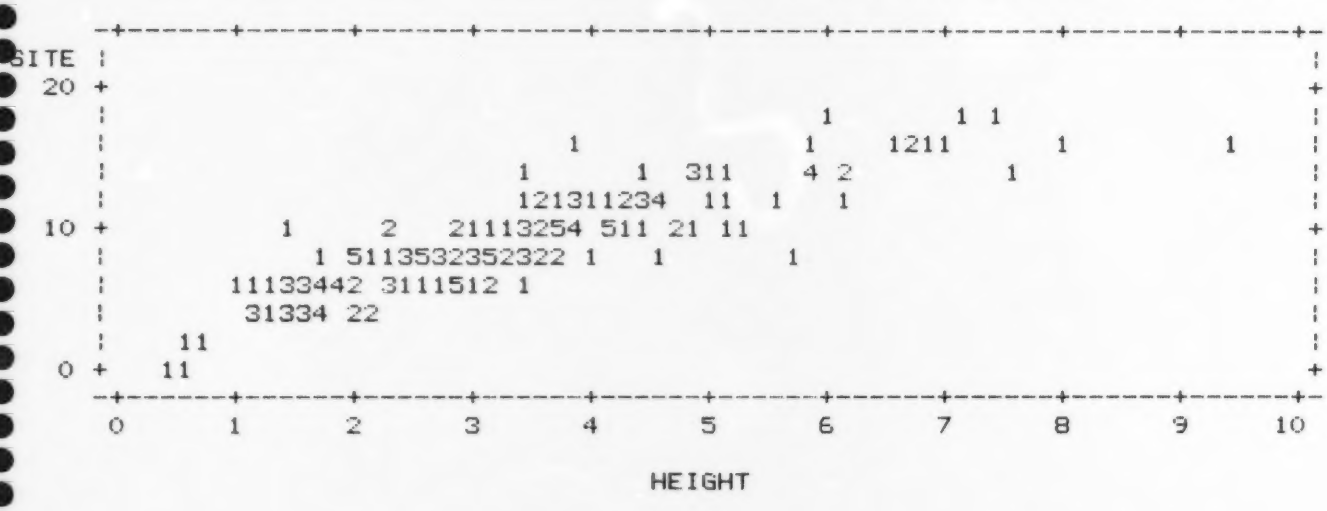
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	1774.67120	1774.67120	617.000	0.0001
Error	177	509.10345	2.87629		
C Total	178	2283.77464			

Root MSE	1.69596	R-square	0.7771
Dep Mean	8.96458	Adj R-sq	0.7758
C.V.	18.91849		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	2.454101	0.29114627	8.429	0.0001
HEIGHT	1	1.930517	0.07771969	24.839	0.0001



Model: MODEL1 - 30 YRS
Dependent Variable: SITE

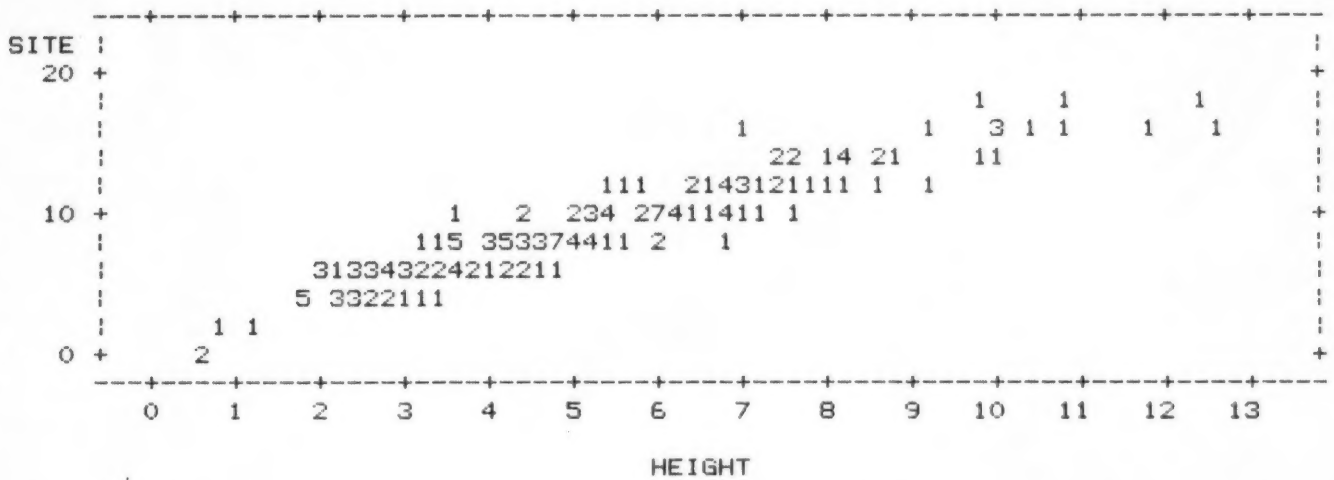
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	2040.66083	2040.66083	1485.711	0.0001
Error	177	243.11381	1.37352		
C Total	178	2283.77464			

Root MSE	1.17197	R-square	0.8935
Dep Mean	8.96458	Adj R-sq	0.8929
C.V.	13.07339		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.609984	0.20995282	7.668	0.0001
HEIGHT	1	1.397856	0.03626563	38.545	0.0001



Model: MODEL1 - 40 YRS
Dependent Variable: SITE

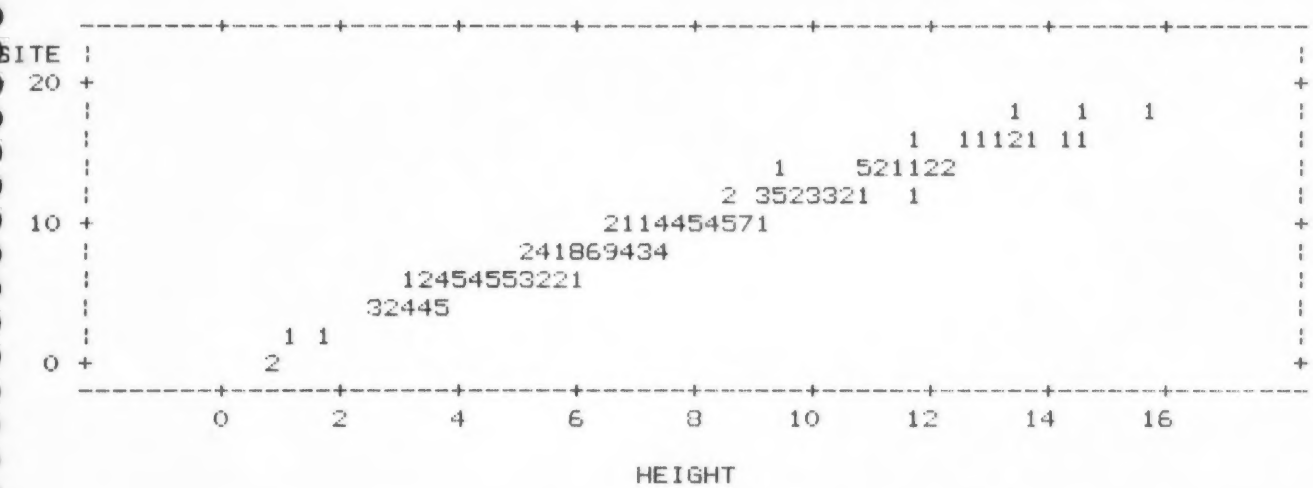
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	2224.62548	2224.62548	6657.046	0.0001
Error	177	59.14917	0.33418		
C Total	178	2283.77464			

Root MSE	0.57808	R-square	0.9741
Dep Mean	8.96458	Adj R-sq	0.9740
C.V.	6.44848		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.726751	0.10982209	6.618	0.0001
HEIGHT	1	1.145449	0.01403897	81.591	0.0001



Model: MODEL1 - 60 YRS
Dependent Variable: SITE

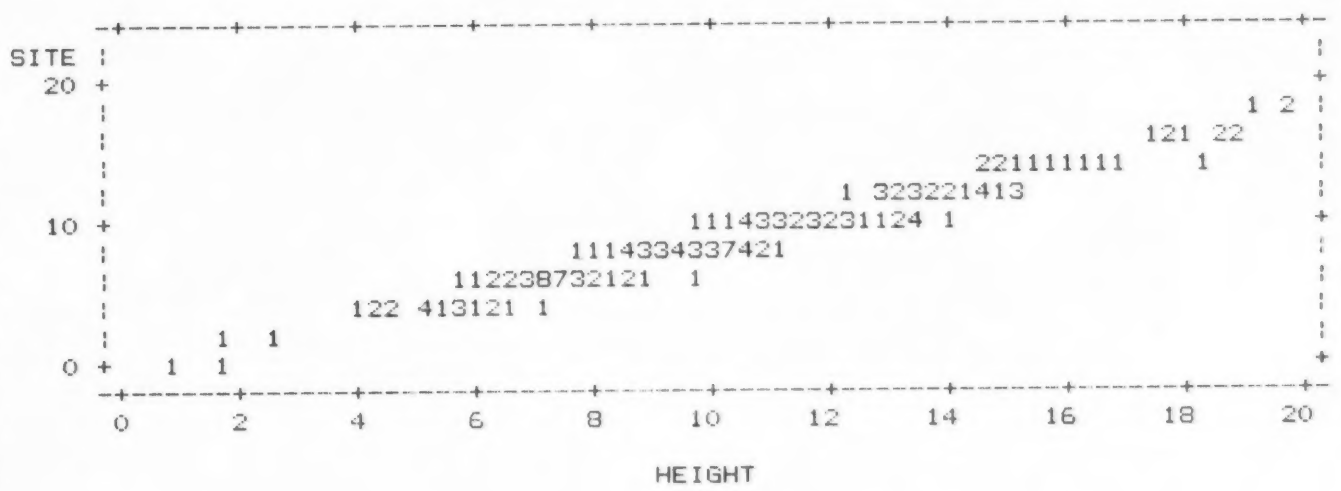
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	2139.08116	2139.08116	6920.741	0.0001
Error	168	51.92589	0.30908		
C Total	169	2191.00704			

Root MSE	0.55595	R-square	0.9763
Dep Mean	8.89482	Adj R-sq	0.9762
C.V.	6.25029		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.573240	0.12153648	-4.717	0.0001
HEIGHT	1	0.901710	0.01083904	83.191	0.0001



Model: MODEL1 - 70 YRS
Dependent Variable: SITE

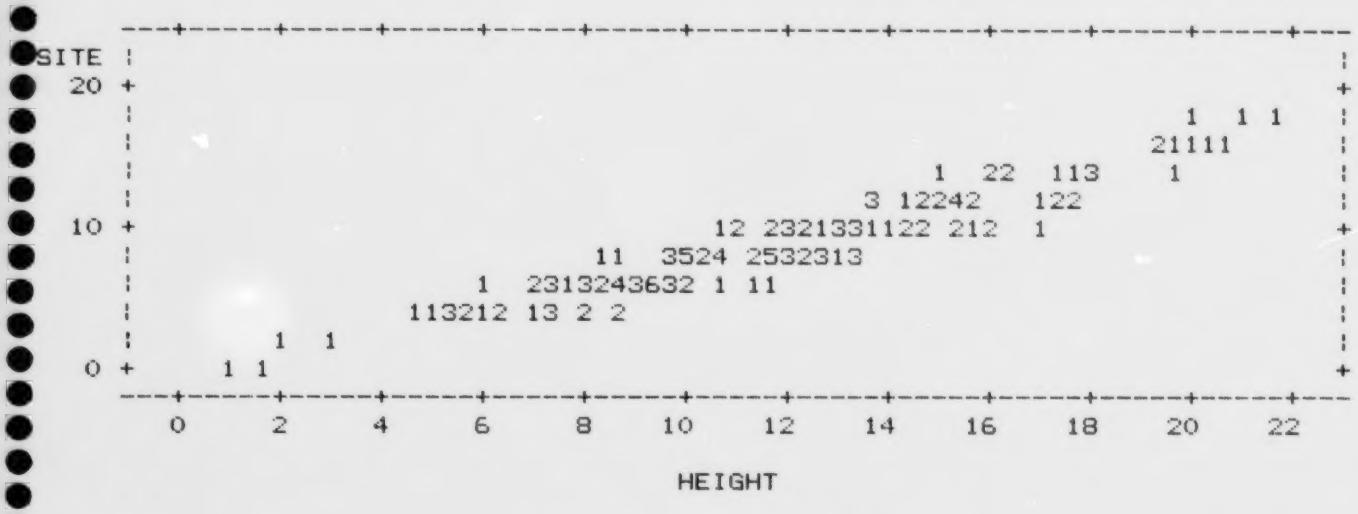
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	1873.99929	1873.99929	1866.855	0.0001
Error	156	156.59702	1.00383		
C Total	157	2030.59631			

Root MSE	1.00191	R-square	0.9229
Dep Mean	8.73076	Adj R-sq	0.9224
C.V.	11.47565		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-1.012303	0.23916960	-4.233	0.0001
HEIGHT	1	0.826672	0.01913277	43.207	0.0001



Model: MODEL1 - 80 YRS
Dependent Variable: SITE

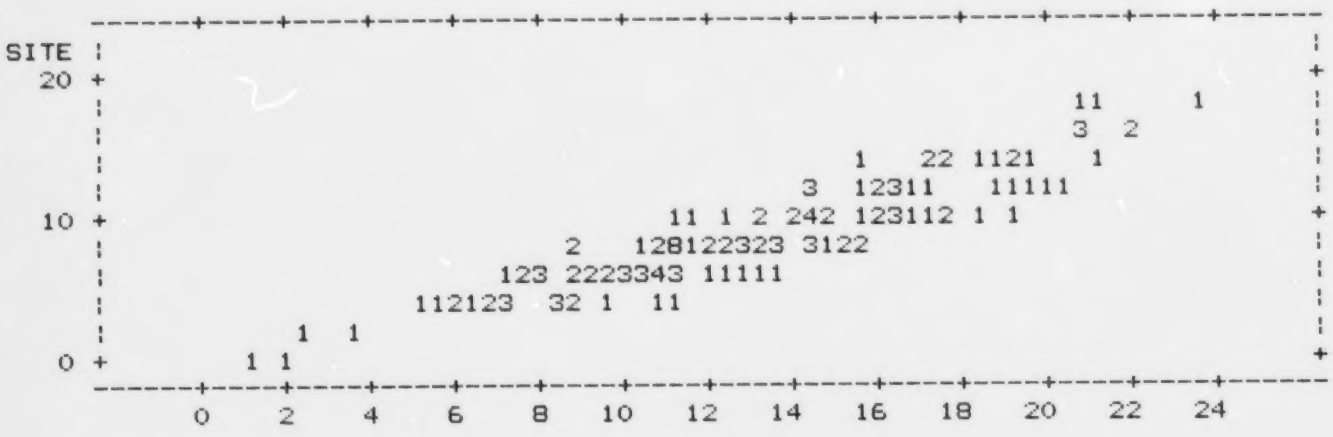
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	1667.21216	1667.21216	939.499	0.0001
Error	144	255.53902	1.77458		
C Total	145	1922.75118			

Root MSE	1.33213	R-square	0.8671
Dep Mean	8.66432	Adj R-sq	0.8662
C.V.	15.37493		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for HO: Parameter=0	Prob > |T|
INTERCEP	1	-1.170743	0.33928171	-3.451	0.0007
HEIGHT	1	0.754734	0.02462327	30.651	0.0001



Model: MODEL1 - 90 YRS
Dependent Variable: SITE

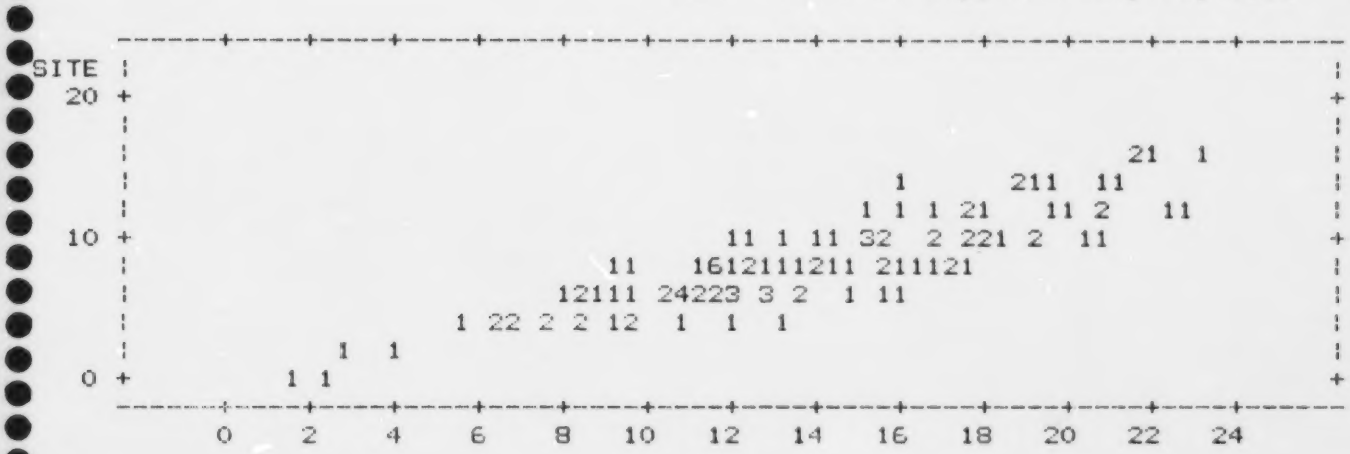
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	1068.47897	1068.47897	462.822	0.0001
Error	115	265.49075	2.30862		
C Total	116	1333.96972			

Root MSE	1.51941	R-square	0.8010
Dep Mean	8.22632	Adj R-sq	0.7992
C.V.	18.47013		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.671886	0.43681630	-1.538	0.1268
HEIGHT	1	0.646937	0.03007150	21.513	0.0001



Model: MODEL1 - 100 YRS
Dependent Variable: SITE

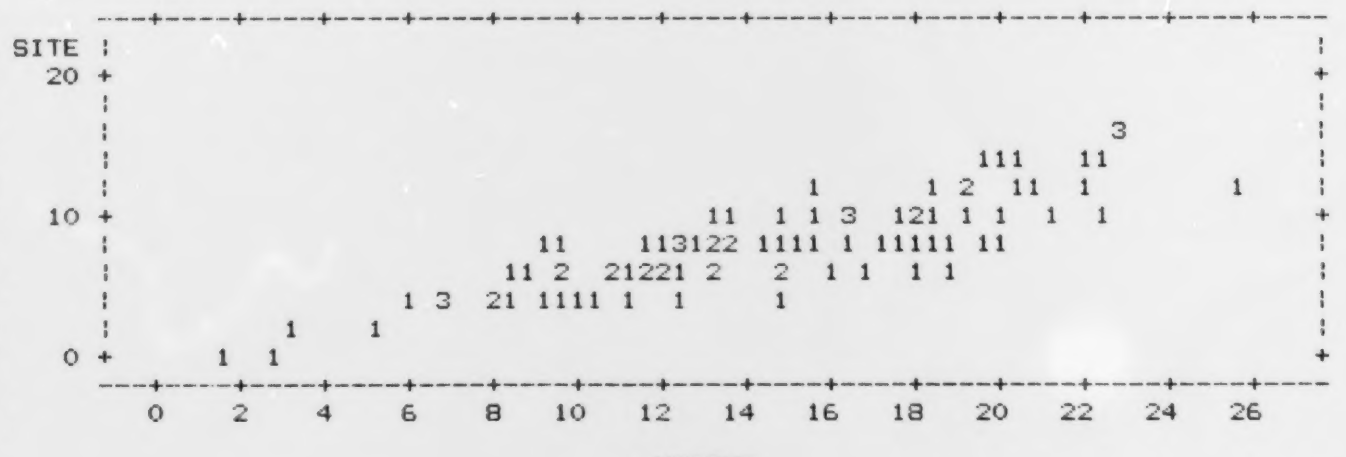
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	787.44492	787.44492	264.208	0.0001
Error	91	271.21587	2.98039		
C Total	92	1058.66079			

Root MSE	1.72638	R-square	0.7438
Dep Mean	7.90183	Adj R-sq	0.7410
C.V.	21.84788		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.392318	0.54075947	-0.725	0.4700
HEIGHT	1	0.573883	0.03530610	16.254	0.0001



Model: MODEL1 - 110 YRS
Dependent Variable: SITE

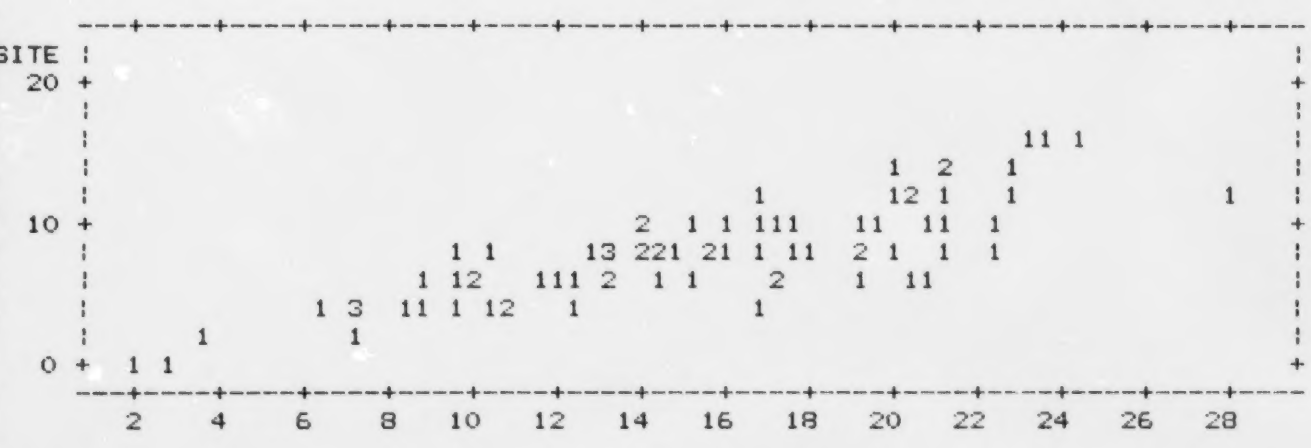
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	641.17669	641.17669	171.586	0.0001
Error	78	291.46825	3.73677		
C Total	79	932.64494			

Root MSE	1.93307	R-square	0.6875
Dep Mean	7.88587	Adj R-sq	0.6835
C.V.	24.51311		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.105462	0.64722004	-0.163	0.8710
HEIGHT	1	0.522421	0.03988226	13.099	0.0001



Model: MODEL1 - 120 YRS
Dependent Variable: SITE

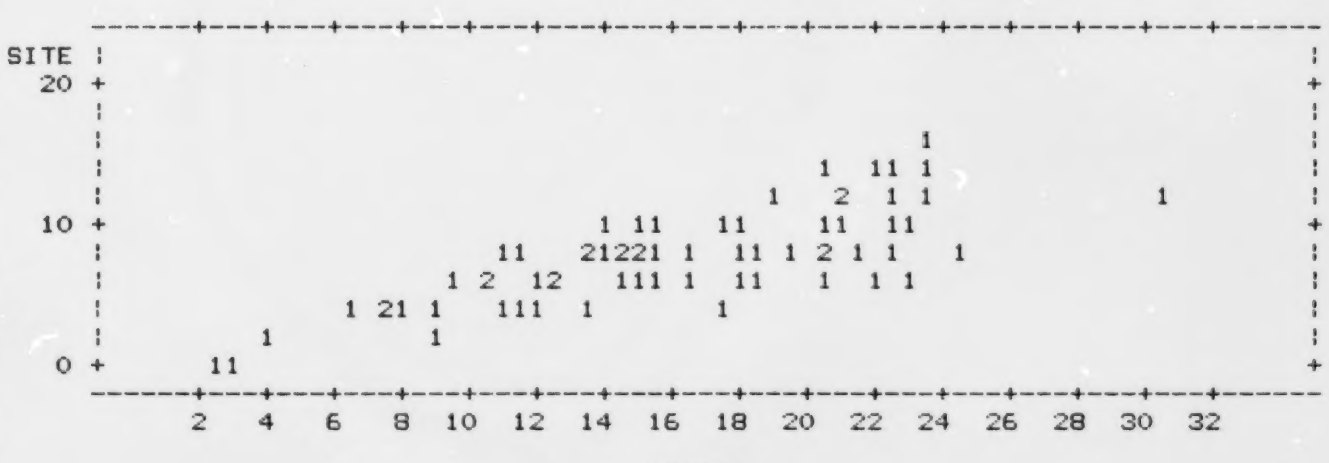
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	450.06044	450.06044	104.366	0.0001
Error	66	284.61384	4.31233		
C Total	67	734.67429			

Root MSE	2.07662	R-square	0.6126
Dep Mean	7.71324	Adj R-sq	0.6067
C.V.	26.92275		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.458058	0.75350693	0.608	0.5453
HEIGHT	1	0.451597	0.04420506	10.216	0.0001



Model: MODEL1 - 130 YRS
Dependent Variable: SITE

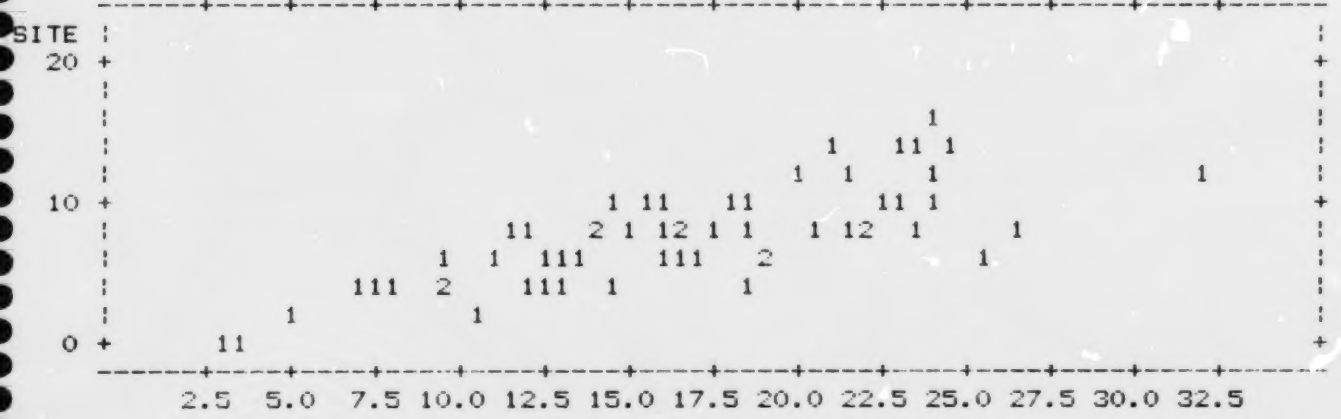
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	407.66241	407.66241	89.707	0.0001
Error	56	254.48484	4.54437		
C Total	57	662.14726			

Root MSE	2.13175	R-square	0.6157
Dep Mean	7.59086	Adj R-sq	0.6088
C.V.	28.08315		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.415912	0.80760004	0.515	0.6086
HEIGHT	1	0.434070	0.04582961	9.471	0.0001



Model: MODEL1 - 140 YRS
Dependent Variable: SITE

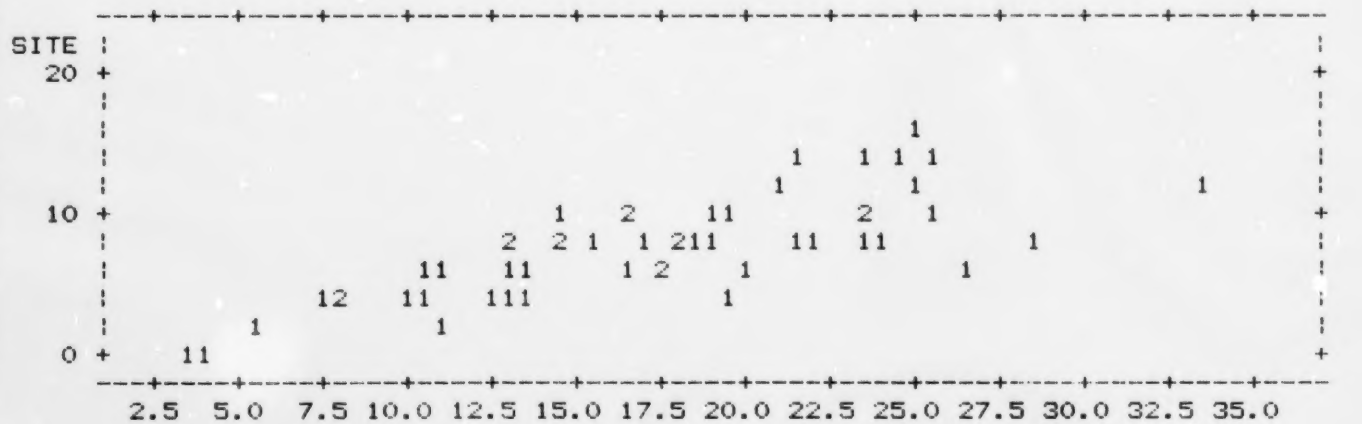
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	383.68914	383.68914	81.111	0.0001
Error	51	241.25127	4.73042		
C Total	52	624.94041			

Root MSE	2.17495	R-square	0.6140
Dep Mean	7.60189	Adj R-sq	0.6064
C.V.	28.61069		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.438432	0.84965005	0.516	0.6081
HEIGHT	1	0.416713	0.04626974	9.006	0.0001



Model: MODEL1 - 150 YRS
Dependent Variable: SITE

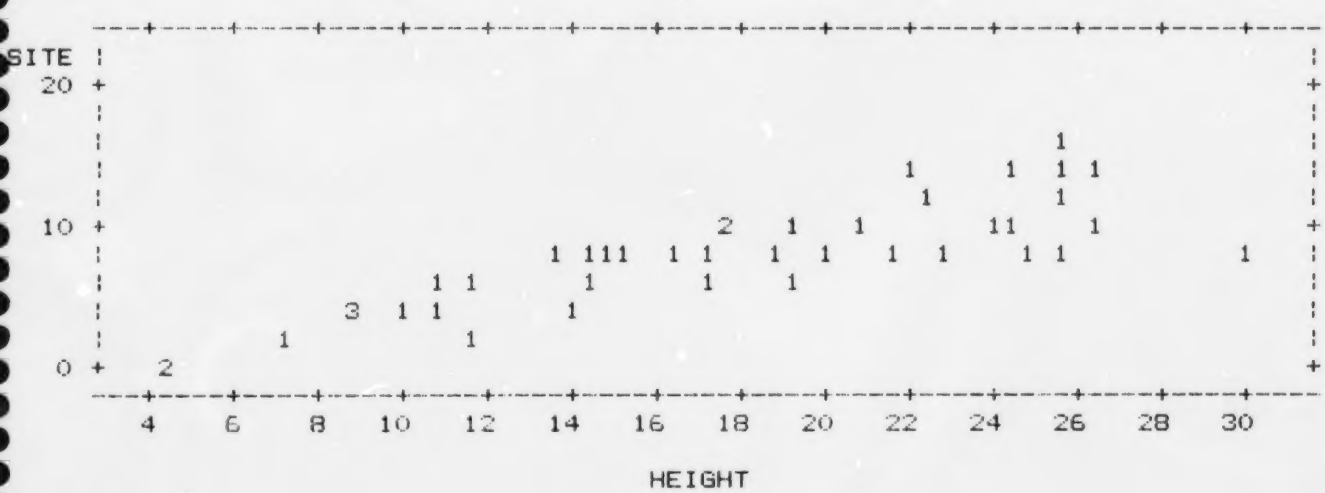
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	404.99095	404.99095	110.694	0.0001
Error	40	146.34649	3.65866		
C Total	41	551.33744			

Root MSE	1.91276	R-square	0.7346
Dep Mean	7.80452	Adj R-sq	0.7279
C.V.	24.50839		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-0.442038	0.83753863	-0.528	0.6006
HEIGHT	1	0.469329	0.04460835	10.521	0.0001



TREEB50

INDIVIDUAL TREE FILE GENERATION

GIVE DATA FILE NAME [*.DAT] ->WS10.DAT

DATASET	WS1	TREE =	952	SITE INDEX =	12.24	AGE 1.3 M =	12
DATASET	WS1	TREE =	953	SITE INDEX =	13.02	AGE 1.3 M =	11
DATASET	WS1	TREE =	954	SITE INDEX =	9.33	AGE 1.3 M =	13
DATASET	WS1	TREE =	955	SITE INDEX =	7.10	AGE 1.3 M =	11
DATASET	WS1	TREE =	957	SITE INDEX =	7.64	AGE 1.3 M =	12
DATASET	WS1	TREE =	961	SITE INDEX =	11.71	AGE 1.3 M =	8
DATASET	WS1	TREE =	962	SITE INDEX =	12.04	AGE 1.3 M =	9
DATASET	WS1	TREE =	964	SITE INDEX =	13.42	AGE 1.3 M =	8
DATASET	WS1	TREE =	965	SITE INDEX =	15.10	AGE 1.3 M =	7
DATASET	WS1	TREE =	966	SITE INDEX =	17.92	AGE 1.3 M =	6
DATASET	WS1	TREE =	969	SITE INDEX =	12.51	AGE 1.3 M =	13
DATASET	WS1	TREE =	971	SITE INDEX =	17.36	AGE 1.3 M =	10
DATASET	WS1	TREE =	972	SITE INDEX =	7.66	AGE 1.3 M =	28
DATASET	WS1	TREE =	975	SITE INDEX =	6.62	AGE 1.3 M =	94
DATASET	WS1	TREE =	977	SITE INDEX =	13.75	AGE 1.3 M =	8
DATASET	WS1	TREE =	979	SITE INDEX =	12.20	AGE 1.3 M =	6
DATASET	WS1	TREE =	981	SITE INDEX =	12.12	AGE 1.3 M =	10
DATASET	WS1	TREE =	985	SITE INDEX =	6.52	AGE 1.3 M =	29
DATASET	WS1	TREE =	986	SITE INDEX =	5.89	AGE 1.3 M =	36
DATASET	WS1	TREE =	987	SITE INDEX =	6.52	AGE 1.3 M =	19
DATASET	WS1	TREE =	988	SITE INDEX =	9.36	AGE 1.3 M =	12
DATASET	WS1	TREE =	990	SITE INDEX =	10.15	AGE 1.3 M =	17
DATASET	WS1	TREE =	992	SITE INDEX =	9.02	AGE 1.3 M =	19
DATASET	WS1	TREE =	994	SITE INDEX =	7.27	AGE 1.3 M =	16
DATASET	WS1	TREE =	996	SITE INDEX =	11.54	AGE 1.3 M =	8
DATASET	WS1	TREE =	997	SITE INDEX =	8.69	AGE 1.3 M =	10
DATASET	WS1	TREE =	998	SITE INDEX =	9.28	AGE 1.3 M =	16
DATASET	WS1	TREE =	1000	SITE INDEX =	8.45	AGE 1.3 M =	19
DATASET	WS1	TREE =	1006	SITE INDEX =	14.50	AGE 1.3 M =	6
DATASET	WS1	TREE =	1010	SITE INDEX =	14.52	AGE 1.3 M =	7
DATASET	WS1	TREE =	1011	SITE INDEX =	12.07	AGE 1.3 M =	6
DATASET	WS1	TREE =	1012	SITE INDEX =	14.41	AGE 1.3 M =	8
DATASET	WS1	TREE =	1014	SITE INDEX =	17.82	AGE 1.3 M =	10

F:\YUKSITE>

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TREEB50

        INDIVIDUAL TREE FILE GENERATION

  GIVE DATA FILE NAME [*.DAT] ->WS11.DAT

DATASET  WS11  TREE =  7672  SITE INDEX =   9.66   AGE 1.3 M =  13
DATASET  WS11  TREE =  7682  SITE INDEX =  14.02   AGE 1.3 M =  13
DATASET  WS11  TREE =  7702  SITE INDEX =  19.74   AGE 1.3 M =   5
DATASET  WS11  TREE =  7712  SITE INDEX =  11.53   AGE 1.3 M =   8
DATASET  WS11  TREE =  7722  SITE INDEX =  14.11   AGE 1.3 M =  10
DATASET  WS11  TREE =  7732  SITE INDEX =  15.28   AGE 1.3 M =   9
DATASET  WS11  TREE =  7742  SITE INDEX =  13.13   AGE 1.3 M =  10
DATASET  WS11  TREE =  7752  SITE INDEX =  10.03   AGE 1.3 M =   9
DATASET  WS11  TREE =  7772  SITE INDEX =  14.13   AGE 1.3 M =  11
DATASET  WS11  TREE =  7792  SITE INDEX =  13.06   AGE 1.3 M =  11
DATASET  WS11  TREE =  7802  SITE INDEX =  10.72   AGE 1.3 M =  12
DATASET  WS11  TREE =  7812  SITE INDEX =  12.29   AGE 1.3 M =  12
DATASET  WS11  TREE =  8092  SITE INDEX =  14.55   AGE 1.3 M =  22
DATASET  WS11  TREE =  8102  SITE INDEX =   8.39   AGE 1.3 M =  13
DATASET  WS11  TREE =  8112  SITE INDEX =  10.10   AGE 1.3 M =  12
DATASET  WS11  TREE =  8122  SITE INDEX =   6.49   AGE 1.3 M =  17
DATASET  WS11  TREE =  8522  SITE INDEX =  15.21   AGE 1.3 M =   5
DATASET  WS11  TREE =  8542  SITE INDEX =  17.07   AGE 1.3 M =   6
DATASET  WS11  TREE =  8552  SITE INDEX =  16.21   AGE 1.3 M =   7
DATASET  WS11  TREE =  8562  SITE INDEX =  14.69   AGE 1.3 M =   6
DATASET  WS11  TREE =  8572  SITE INDEX =  16.99   AGE 1.3 M =  16

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TREEB50

          INDIVIDUAL TREE FILE GENERATION

   GIVE DATA FILE NAME [*.DAT] ->WS12.DAT

DATASET  WS12  TREE =  6272  SITE INDEX =  14.31    AGE 1.3 M =   9
DATASET  WS12  TREE =  6372  SITE INDEX =  18.30    AGE 1.3 M =   5
DATASET  WS12  TREE =  6402  SITE INDEX =  15.23    AGE 1.3 M =   5
DATASET  WS12  TREE =  6412  SITE INDEX =  12.37    AGE 1.3 M =  11
DATASET  WS12  TREE =  6472  SITE INDEX =  19.40    AGE 1.3 M =   8
DATASET  WS12  TREE =  6482  SITE INDEX =  15.83    AGE 1.3 M =   6
DATASET  WS12  TREE =  6492  SITE INDEX =  12.20    AGE 1.3 M =  15
DATASET  WS12  TREE =  6502  SITE INDEX =  12.65    AGE 1.3 M =   4
DATASET  WS12  TREE =  6512  SITE INDEX =  10.80    AGE 1.3 M =  10
DATASET  WS12  TREE =  6532  SITE INDEX =  11.82    AGE 1.3 M =   7
DATASET  WS12  TREE =  6542  SITE INDEX =  14.07    AGE 1.3 M =   9
DATASET  WS12  TREE =  6552  SITE INDEX =  10.89    AGE 1.3 M =   9
DATASET  WS12  TREE =  6852  SITE INDEX =   9.97    AGE 1.3 M =  35
DATASET  WS12  TREE =  6862  SITE INDEX =   8.16    AGE 1.3 M =  31
DATASET  WS12  TREE =  6872  SITE INDEX =   6.46    AGE 1.3 M =  25
DATASET  WS12  TREE =  6882  SITE INDEX =   6.07    AGE 1.3 M =  22
DATASET  WS12  TREE =  6892  SITE INDEX =  10.40    AGE 1.3 M =  33
DATASET  WS12  TREE =  6902  SITE INDEX =   6.79    AGE 1.3 M =  21
DATASET  WS12  TREE =  6922  SITE INDEX =   5.58    AGE 1.3 M =  15
DATASET  WS12  TREE =  6932  SITE INDEX =   8.43    AGE 1.3 M =  29
DATASET  WS12  TREE =  6942  SITE INDEX =   6.87    AGE 1.3 M =  17
DATASET  WS12  TREE =  6952  SITE INDEX =   9.08    AGE 1.3 M =  33
DATASET  WS12  TREE =  6912  SITE INDEX =   6.70    AGE 1.3 M =  25
DATASET  WS12  TREE =  6962  SITE INDEX =   7.35    AGE 1.3 M =  25
DATASET  WS12  TREE =  6972  SITE INDEX =   6.29    AGE 1.3 M =  27
DATASET  WS12  TREE =  6982  SITE INDEX =  13.63    AGE 1.3 M =  19
DATASET  WS12  TREE =  7602  SITE INDEX =  14.85    AGE 1.3 M =   5
DATASET  WS12  TREE =  7612  SITE INDEX =  11.02    AGE 1.3 M =  10
DATASET  WS12  TREE =  7622  SITE INDEX =   6.78    AGE 1.3 M =  17
DATASET  WS12  TREE =  7632  SITE INDEX =   9.48    AGE 1.3 M =   4
DATASET  WS12  TREE =  7642  SITE INDEX =   8.23    AGE 1.3 M =  12

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TREEB50

          INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->WS20.DAT

DATASET  WS2   TREE =   007!  SITE INDEX =  11.64    AGE 1.3 M =  12
DATASET  WS2   TREE =   024%  SITE INDEX =  13.51    AGE 1.3 M =   9
DATASET  WS2   TREE =   026%  SITE INDEX =  13.66    AGE 1.3 M =   9
DATASET  WS2   TREE =   028%  SITE INDEX =   9.73    AGE 1.3 M =   7
DATASET  WS2   TREE =   033%  SITE INDEX =  10.12    AGE 1.3 M =   6
DATASET  WS2   TREE =   034%  SITE INDEX =   8.54    AGE 1.3 M =   9
DATASET  WS2   TREE =   035%  SITE INDEX =   9.35    AGE 1.3 M =   9
DATASET  WS2   TREE =   063!  SITE INDEX =   5.46    AGE 1.3 M =  13
DATASET  WS2   TREE =   064%  SITE INDEX =   8.83    AGE 1.3 M =   7
DATASET  WS2   TREE =   065!  SITE INDEX =   8.84    AGE 1.3 M =  11
DATASET  WS2   TREE =   080!  SITE INDEX =  10.11    AGE 1.3 M =   9
DATASET  WS2   TREE =   081%  SITE INDEX =   6.90    AGE 1.3 M =  19
DATASET  WS2   TREE =   100%  SITE INDEX =   6.82    AGE 1.3 M =  11
DATASET  WS2   TREE =   126%  SITE INDEX =   6.13    AGE 1.3 M =  22
DATASET  WS2   TREE =   902!  SITE INDEX =   9.87    AGE 1.3 M =  11
DATASET  WS2   TREE =   910%  SITE INDEX =   9.49    AGE 1.3 M =  12
DATASET  WS2   TREE =   911!  SITE INDEX =  10.50    AGE 1.3 M =   8
DATASET  WS2   TREE =   934!  SITE INDEX =   7.22    AGE 1.3 M =  18
DATASET  WS2   TREE =   938%  SITE INDEX =   5.01    AGE 1.3 M =  25
DATASET  WS2   TREE =   948%  SITE INDEX =  13.82    AGE 1.3 M =   8
DATASET  WS2   TREE =  1019%  SITE INDEX =  11.02    AGE 1.3 M =   9

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          TREEB50

            INDIVIDUAL TREE FILE GENERATION

      GIVE DATA FILE NAME [*.DAT] ->WS40.DAT

DATASET  WS4   TREE =  1442  SITE INDEX =   8.37     AGE 1.3 M =  13
DATASET  WS4   TREE =  1452  SITE INDEX =   6.93     AGE 1.3 M =  22
DATASET  WS4   TREE =  1522  SITE INDEX =   7.61     AGE 1.3 M =  14
DATASET  WS4   TREE =  1551  SITE INDEX =   8.11     AGE 1.3 M =  16
DATASET  WS4   TREE =  1621  SITE INDEX =   8.47     AGE 1.3 M =  13
DATASET  WS4   TREE =  1641  SITE INDEX =   9.48     AGE 1.3 M =  10
DATASET  WS4   TREE =  1654  SITE INDEX =   9.25     AGE 1.3 M =  20
DATASET  WS4   TREE =  2132  SITE INDEX =   4.73     AGE 1.3 M =  27
DATASET  WS4   TREE =  2421  SITE INDEX =   4.37     AGE 1.3 M =  27
DATASET  WS4   TREE =  2501  SITE INDEX =   5.99     AGE 1.3 M =  31
DATASET  WS4   TREE =  2512  SITE INDEX =   3.26     AGE 1.3 M =  42
DATASET  WS4   TREE =  2522  SITE INDEX =   4.76     AGE 1.3 M =  39
DATASET  WS4   TREE =  2532  SITE INDEX =   6.49     AGE 1.3 M =  22
DATASET  WS4   TREE =  2542  SITE INDEX =   4.79     AGE 1.3 M =  20
DATASET  WS4   TREE =  2562  SITE INDEX =   4.93     AGE 1.3 M =  30

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                INDIVIDUAL TREE FILE GENERATION

      GIVE DATA FILE NAME [*.DAT] ->WS50.DAT

DATASET  WS5   TREE =  3001  SITE INDEX =  16.53    AGE 1.3 M =   4
DATASET  WS5   TREE =  3181  SITE INDEX =  10.59    AGE 1.3 M =  14
DATASET  WS5   TREE =  3202  SITE INDEX =   9.06    AGE 1.3 M =  21
DATASET  WS5   TREE =  3221  SITE INDEX =  10.85    AGE 1.3 M =  13
DATASET  WS5   TREE =  3251  SITE INDEX =  12.39    AGE 1.3 M =  12
DATASET  WS5   TREE =  3562  SITE INDEX =   6.15    AGE 1.3 M =  23
DATASET  WS5   TREE =  3571  SITE INDEX =   9.25    AGE 1.3 M =  15
DATASET  WS5   TREE =  3611  SITE INDEX =  10.70    AGE 1.3 M =   8
DATASET  WS5   TREE =  3622  SITE INDEX =   8.31    AGE 1.3 M =   9
DATASET  WS5   TREE =  3631  SITE INDEX =  11.34    AGE 1.3 M =  11
DATASET  WS5   TREE =  3801  SITE INDEX =   6.82    AGE 1.3 M =  17
DATASET  WS5   TREE =  3811  SITE INDEX =   6.00    AGE 1.3 M =  18
DATASET  WS5   TREE =  3862  SITE INDEX =  12.67    AGE 1.3 M =  18
DATASET  WS5   TREE =  3872  SITE INDEX =  11.99    AGE 1.3 M =  15
DATASET  WS5   TREE =  3882  SITE INDEX =  12.67    AGE 1.3 M =  13
DATASET  WS5   TREE =  3891  SITE INDEX =  16.48    AGE 1.3 M =  20

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TREEB50

          INDIVIDUAL TREE FILE GENERATION

     GIVE DATA FILE NAME [*.DAT] ->WS80.DAT

DATASET  WS8   TREE =  4151  SITE INDEX =   8.06     AGE 1.3 M =   9
DATASET  WS8   TREE =  4172  SITE INDEX =   9.88     AGE 1.3 M =  32
DATASET  WS8   TREE =  4162  SITE INDEX =   8.58     AGE 1.3 M =  16
DATASET  WS8   TREE =  4192  SITE INDEX =   7.02     AGE 1.3 M =  17
DATASET  WS8   TREE =  4202  SITE INDEX =   7.57     AGE 1.3 M =  17
DATASET  WS8   TREE =  4302  SITE INDEX =   7.81     AGE 1.3 M =  17
DATASET  WS8   TREE =  4312  SITE INDEX =   7.22     AGE 1.3 M =  16
DATASET  WS8   TREE =  4322  SITE INDEX =   7.89     AGE 1.3 M =  16
DATASET  WS8   TREE =  4362  SITE INDEX =   9.82     AGE 1.3 M =  13
DATASET  WS8   TREE =  4372  SITE INDEX =  11.64     AGE 1.3 M =  11
DATASET  WS8   TREE =  4392  SITE INDEX =  10.01     AGE 1.3 M =  18
DATASET  WS8   TREE =  4431  SITE INDEX =  10.93     AGE 1.3 M =   6
DATASET  WS8   TREE =  4451  SITE INDEX =  11.69     AGE 1.3 M =  30
DATASET  WS8   TREE =  4532  SITE INDEX =   9.16     AGE 1.3 M =  12
DATASET  WS8   TREE =  4462  SITE INDEX =  10.64     AGE 1.3 M =  18
DATASET  WS8   TREE =  4471  SITE INDEX =   9.38     AGE 1.3 M =  34
DATASET  WS8   TREE =  4612  SITE INDEX =   7.96     AGE 1.3 M =   9
DATASET  WS8   TREE =  4661  SITE INDEX =   2.71     AGE 1.3 M =  88
DATASET  WS8   TREE =  4692  SITE INDEX =   2.22     AGE 1.3 M =  76
DATASET  WS8   TREE =  4701  SITE INDEX =   2.15     AGE 1.3 M =  20
DATASET  WS8   TREE =  4752  SITE INDEX =   5.73     AGE 1.3 M =  13
DATASET  WS8   TREE =  4762  SITE INDEX =   5.47     AGE 1.3 M =  14

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TREEB50

          INDIVIDUAL TREE FILE GENERATION

    GIVE DATA FILE NAME [*.DAT] ->WS90.DAT

DATASET  WS9   TREE =  5191  SITE INDEX =   6.78    AGE 1.3 M =  33
DATASET  WS9   TREE =  5711  SITE INDEX =  16.75    AGE 1.3 M =   6
DATASET  WS9   TREE =  5721  SITE INDEX =  13.91    AGE 1.3 M =   6
DATASET  WS9   TREE =  5731  SITE INDEX =  15.91    AGE 1.3 M =   8
DATASET  WS9   TREE =  5801  SITE INDEX =  17.79    AGE 1.3 M =   6
DATASET  WS9   TREE =  5871  SITE INDEX =  13.23    AGE 1.3 M =   8
DATASET  WS9   TREE =  5882  SITE INDEX =   7.73    AGE 1.3 M =  11
DATASET  WS9   TREE =  5892  SITE INDEX =  12.11    AGE 1.3 M =  20
DATASET  WS9   TREE =  5902  SITE INDEX =  10.46    AGE 1.3 M =  15
DATASET  WS9   TREE =  5922  SITE INDEX =  10.81    AGE 1.3 M =   8
DATASET  WS9   TREE =  5931  SITE INDEX =  10.70    AGE 1.3 M =   9
DATASET  WS9   TREE =  5941  SITE INDEX =  12.40    AGE 1.3 M =   8
DATASET  WS9   TREE =  5952  SITE INDEX =  10.61    AGE 1.3 M =   7
DATASET  WS9   TREE =  5962  SITE INDEX =  10.00    AGE 1.3 M =   9
DATASET  WS9   TREE =  5982  SITE INDEX =  10.28    AGE 1.3 M =  12
DATASET  WS9   TREE =  5992  SITE INDEX =   7.01    AGE 1.3 M =  25
DATASET  WS9   TREE =  6012  SITE INDEX =   9.66    AGE 1.3 M =  10
DATASET  WS9   TREE =  6032  SITE INDEX =   9.59    AGE 1.3 M =   9
DATASET  WS9   TREE =  6092  SITE INDEX =   5.53    AGE 1.3 M =  22

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